

**THE IMPACTS OF THE CANTERBURY EARTHQUAKES ON
EDUCATIONAL INEQUALITIES AND ACHIEVEMENT
IN CHRISTCHURCH SECONDARY SCHOOLS**

A THESIS SUBMITTED IN FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE IN GEOGRAPHY

BY

MARIA JOSEPHINE CONNOLLY

DEPARTMENT OF GEOGRAPHY
UNIVERSITY OF CANTERBURY

2013

Abstract

During 2010 and 2011, major earthquakes caused widespread damage and the deaths of 185 people in the city of Christchurch. Damaged school buildings resulted in state intervention which required amendment of the Education Act of 1989, and the development of 'site sharing agreements' in undamaged schools to cater for the needs of students whose schools had closed. An effective plan was also developed for student assessment through establishing an earthquake impaired derived grade process.

Previous research into traditional explanations of educational inequalities in the United Kingdom, the United States of America, and New Zealand were reviewed through various processes within three educational inputs: the student, the school and the state. Research into the impacts of urban natural disasters on education and education inequalities found literature on post disaster education systems but nothing could be found that included performance data.

The impacts of the Canterbury earthquakes on educational inequalities and achievement were analysed over 2009-2012. The baseline year was 2009, the year before the first earthquake, while 2012 is seen as the recovery year as no schools closed due to seismic events and there was no state intervention into the education of the region. National Certificate of Educational Achievement (NCEA) results levels 1-3 from thirty-four secondary schools in the greater Christchurch region were graphed and analysed. Regression analysis indicates; in 2009, educational inequalities existed with a strong positive relationship between a school's decile rating and NCEA achievement. When schools were grouped into decile rankings (1-10) and their 2010 NCEA levels 1-3 results were compared with the previous year, the percentage of change indicates an overall lower NCEA achievement in 2010 across all deciles, but particularly in lower decile schools. By contrast, when 2011 NCEA results were compared with those of 2009, as a percentage of change, lower decile schools fared better. Non site sharing schools also achieved higher results than site sharing schools. State interventions, had however contributed towards student's achieving national examinations and entry to university in 2011. When NCEA results for 2012 were compared to 2009 educational inequalities still exist, however in 2012 the positive relationship between decile rating and achievement is marginally weaker than in 2009.

Human ethics approval was required to survey one Christchurch secondary school community of students (aged between 12 and 18), teachers and staff, parents and caregivers during October 2011. Participation was voluntary and without incentives, 154 completed questionnaires were received. The Canterbury earthquakes and aftershocks changed the lives of the research participants. This school community was displaced to another school due to the Christchurch earthquake on 22 February 2011. Research results are grouped under four geographical perspectives; spatial impacts, socio-economic impacts, displacement, and health and wellbeing. Further research possibilities include researching the lag effects from the Canterbury earthquakes on school age children.

Table of Contents

Abstract.....	2
List of Figures.....	6
List of Tables.....	8
List of Appendices	9
Chapter 1: Introduction	10
1.1 Personal Connections	10
1.2 Urban Disasters.....	11
1.3 Geography and Education	13
1.4 Aims of this Thesis	15
1.5 Thesis Outline	16
Chapter 2: Educational Inequalities.....	18
2.1 Introduction.....	18
2.2 Education Input No.1: The Student	21
2.2.1 Social class and family background.....	21
2.2.2 Gender	29
2.2.3 Race and ethnicity.....	30
2.3 Educational Input No.2: The School.....	34
2.4 Educational Input No.3: The State	45
2.4.1 State intervention in education: the Welfare State, 1930s - 1980.....	48
2.4.2 The Neoliberal State and education reforms	52
2.4.3 Impacts of neoliberal education reforms on educational inequalities.....	56
2.5 Conclusion	65
Chapter 3: Urban Natural Disasters and their Educational Impacts.....	68
3.1 Introduction	68
3.2 Impacts of urban natural disasters on people and places.....	69
3.2.1 Types of impacts	71
3.2.2 Technology and research into reducing the impacts.....	76
3.3 Urban natural disasters and environmental justice	78
3.4 Impacts of urban natural disasters on educational inequalities	82
3.5 Conclusion	86

Chapter 4: The impacts of the Canterbury earthquakes on the city of Christchurch, New Zealand	88
4.1 Introduction	88
4.2 The physical environment of Christchurch, Canterbury	89
4.3 Natural events in the Canterbury region	92
4.4 The history of urban settlement in Christchurch	100
4.5 Greater Christchurch secondary schools	105
4.5.1 History of Christchurch secondary schools	107
4.6 Impacts of the Canterbury earthquakes on greater Christchurch schools	113
4.7 State interventions during 2011 into the education of Christchurch schools and students following the Christchurch earthquake on 22 February 2011	114
4.8 Conclusion	125
Chapter 5: Research Methodology	128
5.1 Introduction	128
5.2 Data sources	129
5.3 Objective 1: To analyse the effects of the earthquakes on existing educational inequalities between secondary schools in Christchurch.	130
5.4 Objective 2: To examine the impacts of the earthquakes on a sample school community who were displaced (to another school) because of the Christchurch earthquake of 22 February 2011	136
5.4.1 Ethics approval	136
5.4.2 Questionnaire	138
5.5 Objective 3: To record and evaluate state interventions into secondary school education in the greater Christchurch region during 2011.	141
5.6 Limitations of the research methodology	142
5.7 Conclusion	143
Chapter 6: Impacts of the earthquakes and aftershocks on education and learning in greater Christchurch secondary schools	144
6.1 Introduction	144
6.2 Greater Christchurch secondary schools	145
6.3 What differences existed in educational performance of Christchurch secondary schools prior to the Canterbury earthquake in September 2010?	148
6.4 What impacts did the September 2010 Canterbury earthquake have upon the subsequent patterns of educational achievement?	153
6.5 To what extent did state interventions following the February 2011 Christchurch earthquake affect patterns of educational performance in the greater Christchurch region?	158
6.5.1 Did site-sharing of secondary schools affect educational performance?	162
6.6 Did educational inequalities between greater Christchurch secondary schools widen as a result of the 2010 – 2011 earthquakes?	169
6.6.1 Social gradients in school performance 2012 and 2009	169
6.6.2 Patterns of change in NCEA results	173
6.7 Conclusion	177

Chapter 7: Impacts of the Canterbury earthquakes and aftershocks on one Christchurch secondary school community.	180
7.1 Introduction	180
7.2 Education performance	183
7.3 Spatial effects	184
7.4 Socio-economic impacts	196
7.5 Displacement	201
7.6 Health and Wellbeing	211
7.7 Conclusion	217
Chapter 8: Conclusion	220
8.1 Introduction	220
8.2 Aim and Objectives	220
8.3 Key Findings	222
8.4 Discussion	229
8.5 Limitations	232
8.6 Future research possibilities	233
8.7 Concluding statement	235
References.....	236
Appendices	250

List of Figures

Figure 1: Processes within the three Educational Inputs influencing Educational Performance	20
Figure 2: Social Class Structure in the USA	24
Figure 3: Distribution of Wealth in the U.S., 2001.....	25
Figure 4: Flood waters inundate housing in New Orleans.	72
Figure 5: Flood waters reached heights of 15 feet in low lying areas in New Orleans.....	75
Figure 6: Darwin after Cyclone Tracy hit December 1974	77
Figure 7: Hurricane Katrina. Montage of NOAA Satellite images prepared by CIMSS	78
Figure 8: Incidence of Parents reporting problems of children's schooling following Cyclone Tracy. 83	
Figure 9: Topographic map of the South Island of New Zealand	89
Figure 10: Christchurch area showing waterways, swamps, and vegetation cover in 1856	90
Figure 11: Changing shorelines of the eastern coastline	91
Figure 12: North Canterbury postglacial marine deposits.....	92
Figure 13: Earthquake damage to the Cathedral Spire. Christchurch on 1st September 1888	94
Figure 14: Location of the Greendale Fault relative to Christchurch.	96
Figure 15: Image of city of Christchurch.	99
Figure 16: Plan of the City of Christchurch drawn by J. Cartman in 1850	101
Figure 17: 2006 Deprivation Map of Christchurch.....	106
Figure 18: Regional Council and Territorial Authority Areas in 2009.	107
Figure 19: Shirley Boys' High School after the 22 February 2011 earthquake	116
Figure 20: Avonside Girls' High School main block prior to demolition.	117
Figure 21: Cathedral of the Blessed Sacrament after the 22 February 2011 earthquake.	118

Figure 22: Dismantling of the dome off the Cathedral of the Blessed Sacrament.	119
Figure 23: Marian College grounds after 22 February 2011 earthquake..	120
Figure 24: Map showing the approximate location of damaged schools.....	123
Figure 25: 2009 NCEA level 1 results.	149
Figure 26: 2009 NCEA level 2 results	150
Figure 27: 2009 NCEA level 3 results	151
Figure 28: 2010 NCEA level 1 results as a percentage of change from 2009.	154
Figure 29: 2010 NCEA level 2 results as a percentage of change from 2009.	155
Figure 30: 2010 NCEA level 3 results as a percentage of change from 2009	156
Figure 31: 2011 NCEA level 1 results as a percentage of change from the 2009 NCEA results.....	159
Figure 32: 2011 NCEA level 2 results as a percentage of change from the 2009 NCEA results.....	159
Figure 33: 2011 NCEA level 3 results as a percentage of change from the 2009 NCEA results.....	160
Figure 34: 2011 NCEA results - site sharing schools vs non site sharing schools.....	164
Figure 35: 2011 NCEA results site sharing schools - short-term vs long term	166
Figure 36: 2011 NCEA results of east Christchurch schools.....	168
Figure 37: 2012 NCEA level 1 results	171
Figure 38: 2012 NCEA level 2 results	171
Figure 39: 2012 NCEA level 3 results	172
Figure 40: 2012 NCEA level 1 results as a percentage of change from 2009 NCEA level 1 results ...	174
Figure 41: 2012 NCEA level 2 results as a percentage of change from 2009 NCEA level 2 results ...	174
Figure 42: 2012 NCEA level 3 results as a percentage of change from 2009 NCEA level 3 results ...	175
Figure 43: Previous earthquake experiences prior to 4 September 2010	185

List of Tables

Table 1: Educational attainment by class of origin	26
Table 2: Comparison of Education Services between the UK, the USA, and NZ.....	55
Table 3: Characteristics of an Urban Natural Disaster - Actual events.	70
Table 4: Three largest chronological seismic events in the Canterbury region.....	95
Table 5: Site sharing secondary schools during 2011	114
Table 6: The school roll of visiting 'site-sharing' secondary schools.	122
Table 7: Thirty four secondary schools in the greater Christchurch region.....	147
Table 8: 2010 NCEA levels 1-3 cumulative results as a percentage of change from 2009	157
Table 9: 2011 NCEA levels 1-3 results as a percentage of change from 2009 NCEA results	161
Table 10: Regression Analysis of Decile Ratings and NCEA School Achievement.....	170
Table 11: 2012 NCEA levels 1-3 results as a percentage of change from 2009 NCEA results	173
Table 12: Change in Overall School Results 2011-2012 and 2009-2012.....	176
Table 13: Questionnaires received from various groups within one school community in 2011	182
Table 14: Location of participants on 4 September 2010.....	187
Table 15: Location of participants on 22 February 2011 at 12.52pm.....	192
Table 16: Participants place and experience of the Christchurch Earthquake	194
Table 17: Occupations of our adult participants.....	199
Table 18: New class times and new timetable structure for our visiting school	204
Table 19: Travel Mode of Students during 2011.....	206
Table 20: Results from junior students regarding changes in school location and class times	207
Table 21: Results from senior students regarding changes in school location and class times	209
Table 22: Current state of health.....	215

List of Appendices

- Appendix 1: Canterbury Earthquake (Education Act) Order 2011
- Appendix 2: NCEA results (2009-2012) of thirty-four greater Christchurch secondary schools
- Appendix 3: Questionnaire Information Sheet
- Appendix 4: Student Questionnaire
- Appendix 5: Teacher and Staff Questionnaire
- Appendix 6: Parent and Caregiver Questionnaire
- Appendix 7: Student assent form
- Appendix 8: Teacher and Staff consent form
- Appendix 9: Parent and Caregiver consent form
- Appendix 10: University of Canterbury Human Ethics Committee Approval Letter
- Appendix 11: NZQA Earthquake Impaired Derived Grade Process
- Appendix 12: 2012 NCEA levels 1-3 change in overall school results from 2011
- Appendix 13: 2012 NCEA level 3 results as a percentage of change from 2011 NCEA level 3 results.

Chapter 1: Introduction

1.1 Personal Connections

During 2010 and 2011, one major earthquake and two large aftershocks in the Canterbury region of New Zealand, caused widespread damage and the deaths of 185 people in the city of Christchurch. These three seismic events are often referred as the 'Canterbury Earthquakes' in this thesis. Prior to 2010 relatively few residents, including myself, had experienced a major earthquake. Damaged school buildings resulted in schools entering into 'site-sharing agreements' where the host school operated in the morning and the visiting school operated in the afternoon. Thousands of students were transported in buses across the city to attend their host schools. The residents of Christchurch have now experienced over ten thousand aftershocks since the initial earthquake on 4 September 2010.

As a Christchurch secondary school teacher, the Canterbury earthquakes deeply affected me and this was mirrored in my students, some of whom were studying towards achieving entry to University that year. Many of my students were now living in damaged homes on sunken land, without running water and flushing toilets, and some were experiencing huge emotional losses. Many remained living in this disrupted home environment while their parents waited for notification from the state into whether they could repair their earthquake damaged home or whether their land was now unsuitable for housing re-development. The urban environment was changing as we coped with daily aftershocks and the uncertainty about the safety of our family and friends.

I am self-motivated to be writing about the impacts of a natural disaster that I experienced in my home city. This, in part, is due to my interest in earth sciences and geography. I physically

experienced the Canterbury earthquakes and the aftershock sequence. I surveyed a school community of students, parents and teachers that I worked with, not a community that was foreign to me. I intensely read press releases on how central government was intending to intervene to maintain education as a major enterprise in Canterbury and keep our location 'marketable' following this urban natural disaster. I believe educational achievement can assist students from all socio-economic groups to earn an income that can provide prosperity in their lives and improve their life choices. My concern for my students and my earthquake experiences prompted me to research and write about the educational impacts of natural events.

This thesis represents two years of my life where every day I found time to work towards its completion. It has been my hobby. I found a balance between home life and working life and being a post-graduate student. I am thankful to my thesis supervisors, my family and the school community that I surveyed.

1.2 Urban Disasters

Humans have and will continue to settle in environmentally dangerous places (Pais and Elliott, 2008). They settle in coastal locations, within areas of tectonic activity and establish new urban environments. Although they may have never experienced a local natural disaster, the geographical evidence around them indicates that they are living in a zone where a natural event could occur at any time.

There is a vast body of literature on the impacts of natural disasters on urban environments (Tierney, 1997; Lindell and Perry, 1998; Moore, 2011; Walker, 2011; Cubrinovski, et al., 2012). The physical and environmental impacts include the damage to local infrastructure and the strain placed

on local systems to meet the population's basic needs (Norris, 2002). Economically, the damage to business and reduction in tourism to the city may have a direct effect on the region and nation's GDP. In a developed urban society, disruption to clean running water can be very stressful for a household of post-disaster survivors. But extreme disruption caused by natural disasters reveal the inner workings of a city and how prepared residents were for this event.

An urban disaster is more than an individual-level event. It is also a community-level event with potential psychological consequences even for those persons who experience no direct losses (Norris, 2002). Bolin (1985) observed that there are two broad categories of victims in a disaster; primary victims who directly experience physical, material, or personal losses, and secondary victims who live in the affected area, but sustain no personal injuries or damages. For survivors, the social impacts from disasters include homelessness, profound loss, exposure to the death and dying, displacement or evacuation, on-going financial hardship, short term or long term injuries, ill health and respiratory illnesses. From these conceptualisations, it can be inferred that survivors of urban natural disasters, like the Canterbury earthquakes during 2010 and 2011, can be categorised and indicators of stress and resilience can be assessed at the individual level for all survivors and not just those that have experienced direct losses.

Before a natural disaster, children's lives were generally defined by adults. However, following a natural disaster, school aged children may find themselves in situations where their role within their household changes and they are required to take charge or care for other family members. If they remain in the same urban environment, the process of re-building requires consultation and planning, and the process takes time. By looking to the children, the survivors of this disaster, theoretical approaches of exploring children's' imagination can be developed so the new built environment does not oppress this generation. (Johnston, et al., 2000; Freeman and Tranter, 2011)

1.3 Geography and Education

Natural disasters often have an uneven geographical impact. Disasters and their consequential environmental risks, often adversely affect more disadvantaged parts of a city and a large literature on environmental justice has evolved in the last few decades detailing such risks which often tend to compound other urban social inequalities (Newton, 2009; Mulvaney and Robins, 2010; Lindstrom, 2011).

Within all urban environments there is a measure of wealth that is available through home ownership, house and land values, and the income of the residents. These socio-economic indicators vary within a city and detail the range of inequalities amongst the residents. Education inequalities are the disparity that some students experience in their education when compared to other students, where the quality of education available is closely related to their social class or status, or when unequal educational achievement occurs between students of the same ability (Simons, 1980; Thrupp, 1997). Understanding what influences educational inequalities is important for individual students and their families, the school and its community, the government and policy researchers. (Coleman, et al, 1966; Jencks, et al., 1972; Havighurst and Neugarten, 1975; Bowles and Gintis, 1976; Chapman, 1986; Ball, 1993; Thrupp, 2007; Wilkinson and Pickett, 2009; Borman and Dowling, 2010)

There is a vast range of literature written on raising the achievement of students and tackling education inequalities, and a few on the educational inequalities caused following a urban natural disaster (Milne, 1977; Hardy, 2006; Akers, 2012). But there is little research on the impacts of an urban natural disaster on existing education inequalities or the disproportional effects of an urban natural disaster on a region where educational inequalities already exist. Both of these scenarios can

occur within an urban environment following a natural disaster, where school buildings have collapsed and school resources are not retrievable. Affected students may experience further education inequalities due to displacement from their normal school environment.

Disproportionate effects may be more evident when students living in undamaged parts of the city have not experienced any disruption to their education.

Although good schools make a difference, the biggest influence on educational achievement, how well a child performs in school and later in higher education, is family background (Wilkinson and Pickett, 2009). Following an urban natural disaster, damage to the family home and disruption in schooling may further affect a child's performance academically more so if this child has been categorised as a primary victim (Bolin, 1985) and is also living in poorer parts of the city where education inequalities already exist.

The neoliberal policies of the USA, UK and NZ reformed education during the late 1980s and 1990s. Schools became 'marketable' with parents as 'consumers' who could now choose to send their children elsewhere if dissatisfied. The state reduced its involvement in funding education through increasing parental involvement, parental power and parental choice, which in turn increased a competitive culture between schools. Following an urban natural disaster in a major economic region, neoliberal driven governments will seek to maintain the 'educational marketability' of that region through intervention and collaboration with schools and local authorities to reduce educational inequalities (which now due to their own policies are published on the internet through school achievement results).

1.4 Aims of this Thesis

The overall aim of this research is to investigate the impacts of 2010 and 2011 Canterbury earthquakes on educational inequalities and variations in academic achievement between Christchurch secondary schools through a geographical perspective. Geographic perspectives require the identification of the processes within educational inputs that influence educational inequalities, which may include spatial, socio-economic, displacement, health/wellbeing, contextual and political factors. The various processes are integrated, rather than studied separately, and this geographical approach allows solutions beyond those likely to come from specialists in narrow disciplines.

This aim will be achieved through fulfilling the following research objectives:

1. To analyse the effects of the Canterbury earthquakes (4 September 2010, 22 February 2011, 13 June 2011) on existing educational inequalities between Christchurch secondary schools.
2. To examine the impacts of the earthquakes on a sample school community who were displaced (to another school) because of the Christchurch earthquake of 22 February 2011.
3. To record and evaluate state interventions into secondary school education in the greater Christchurch region during 2011.

This thesis hypothesises that existing educational inequalities in Christchurch have widened as a result of these natural events due to schools and students in eastern parts of the city having been disproportionately affected. This thesis commenced as part-time study in early 2011, before all state interventions were announced, and submission is due on 29 April 2013.

1.5 Thesis Outline

Beyond this introduction, Chapter two introduces education inequalities through examining the process of educating through three educational inputs: the student, the school, and the state.

Inequalities in educational inputs can be associated with inequalities in educational outputs, namely a student's examination results and achievements. Traditional and current explanations of this topic, along with the contextual influences of the school social environment on student achievement are reviewed. This chapter also traces the influence of residential segregation and place effects through the development of education services and reforms. Finally, other social factors that influence education achievement not considered in traditional research are reviewed.

Chapter three researches the global impacts of natural disasters on people and communities in general, but specifically the impacts on education and educational performance. Case studies of six natural events that caused urban natural disasters in modern cities are examined. Environmental Justice is raised as a possible cause of uneven environmental impacts. This chapter also discusses the post-disaster health effects from living in damaged homes which were built on drained wetlands and whether this should now be included under environment justice when the role of health has an effect on education performance.

Chapter four focuses on the local context of the city of Christchurch, New Zealand. This chapter details the history and geography of Christchurch before and after the Canterbury earthquakes. This chapter includes the overall impacts of the earthquakes on Christchurch secondary schools. The chapter initially provides a brief history of each secondary school and a comparison of their education performance prior to the earthquakes. This is followed by a discussion of the length of school closure due to earthquakes and which schools re-located due to building and land damage and entered into site-sharing agreements.

Chapter five describes the methods used in this research, including the approval process required by the University of Canterbury Human Ethics Committee. As my research required participants to reflect on the day the Christchurch earthquake of 22 February 2011 occurred, specific written information and consent was required prior to participants completing the written questionnaire.

Chapter six presents a general qualitative and quantitative overview of changes in educational performance of greater Christchurch secondary schools from 2009 through to 2012. The education performance of thirty four secondary schools are grouped by decile ranking and compared. The year 2009 is determined as the baseline year before the Canterbury earthquake of 4 September 2010 and the Christchurch earthquake of 22 February 2011. The year 2012 is seen as the recovery year where there were no school closures due to seismic events.

Chapter seven provides specific qualitative and quantitative results from the case study of an east Christchurch school community which due to earthquake damage to the school buildings and land, was displaced to the premises of another Christchurch secondary school, as part of a site-sharing agreement during 2011. Participants in this research are school students, teachers and staff, and parents and caregivers. This research was approved by the University of Canterbury Human Ethics Committee. Participation was voluntary. No incentives were provided.

Chapter eight discusses the research findings and discusses future research possibilities. This chapter concludes with examining the research aim, objectives and hypothesis.

Chapter 2: Educational Inequalities

2.1 Introduction

In modern societies there is an expectation that every child will receive an education that will prepare them for the world of work (McLennan, Ryan and Spoonley, 2004). Most school children spend six hours a day, five days a week, in buildings that are specially designated for the purposes of teaching and learning. In secondary schools, students may move from room to room as they learn about different subjects. Teachers are kept busy providing information to promote learning which is then assessed through a range of national examinations. At the end of this process, students are considered to be educated, to have been given the skills that will equip them for the world of work. But not all student outcomes are equal. (McLennan, Ryan and Spoonley, 2004)

Education is the process of teaching and learning within a complex system of interdependent parts referred to in this thesis as educational inputs and outputs. This chapter aims to provide the reader with an understanding to the traditional and current explanations of educational inequalities in the United Kingdom (UK), the United States of America (USA) and New Zealand (NZ) through various processes within three educational inputs: the student, the school, and the state (refer to Figure 1). Examples of educational outputs are students' examination results and achievements.

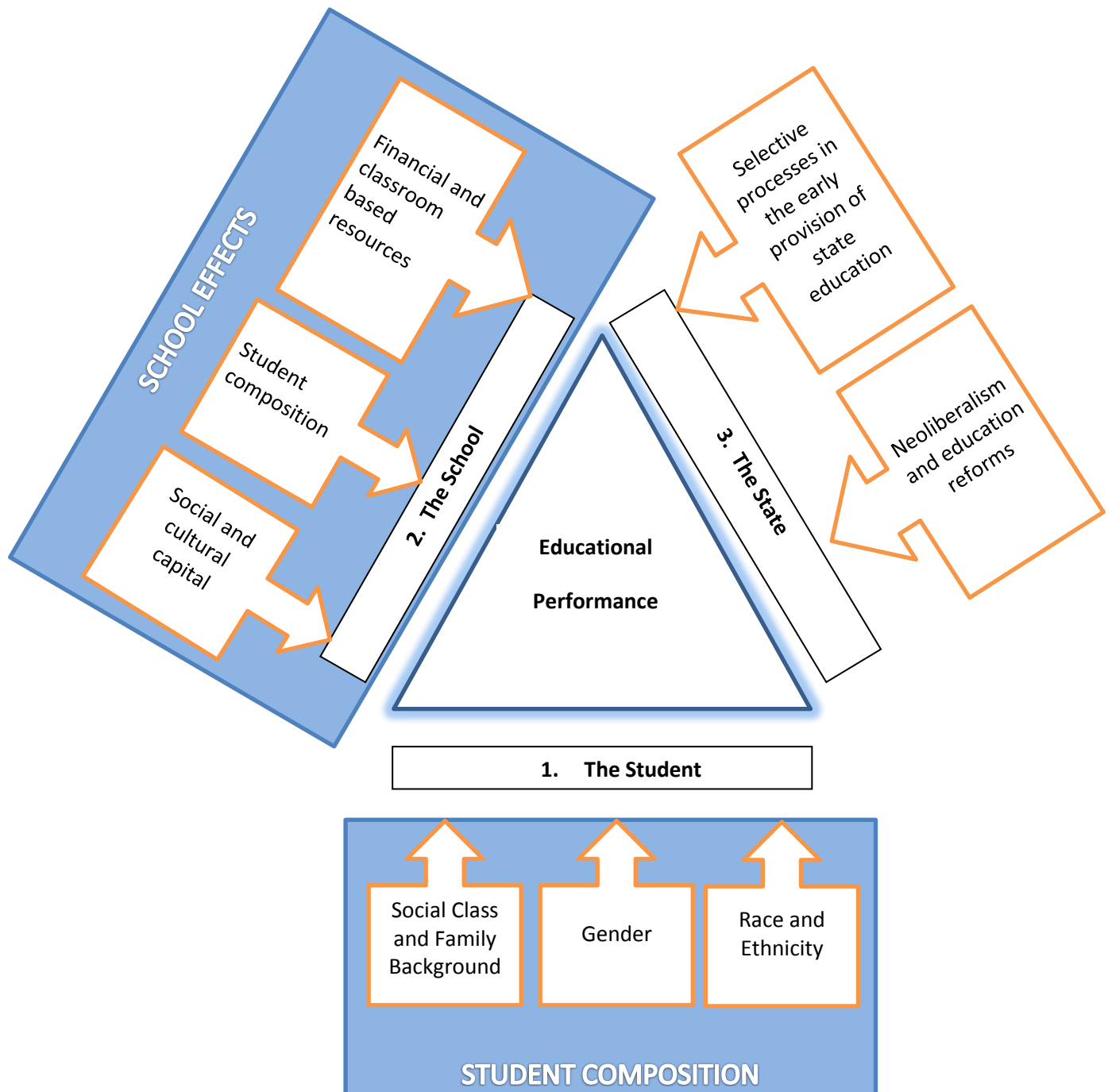
Within this thesis, 'educational performance' looks at the student at an individual level whereas 'educational inequalities' studies the broader geographical perspective. Educational inequalities are defined as the disparity that some students experience in their education when compared to other students. Educational inequalities appear measureable when schools' resources are compared and

found to differ, and when unequal educational achievement occurs between students of the same ability.

Geographic perspectives require the identification of the processes within educational inputs that influence educational inequalities, which may include social, spatial, environmental, contextual and political factors. These various perspectives are integrated, rather than studied separately, and it is this geographical approach that allows solutions beyond those likely to come from specialists in narrow disciplines (Aplin, et al., 2003). Other social sciences, for example Sociology, provide Geography with further perspectives into examining differences in the education performance between students of the same ability. Inequalities in educational inputs can be assumed to be associated with inequalities in educational outputs. Understanding what influences educational inequalities is important for individual students and their families, the school and its community, the government and policy reform researchers.

This chapter begins by reviewing the traditional explanations of educational inequalities through the student's social class and family background, gender, race and ethnicity. The second part reviews international research into the contextual effects of educational inequalities, including the influences of the school's composition and social capital, along with the social environment and neighbourhood, on student achievement. The third section compares government education policies of the UK, USA and NZ that have intervened or influenced educational performance through the development of education services. To conclude, this chapter synthesises the various factors influencing educational performance and identifies some of the gaps identified from previous studies.

Figure 1: Processes within the three Educational Inputs influencing Educational Performance



2.2 Education Input No.1: The Student

Research into educational inequalities at the individual student level has linked the socio-economic status of the family as the principal factor in determining not only the young child's, but also the adolescent's school achievement (Havighurst and Neugarten, 1975). Socio-economic status is the measure of wealth that is available through home ownership, house and land values, and the income of the residents. These socio-economic indicators vary within a city and detail the range of differences or inequalities amongst the residents.

Educational performance and achievement in the UK, USA and NZ is traditionally (quantitatively) assessed in terms of a student's ability to read, comprehend and write English in a national examination. It is not qualitatively based on a student's ability in leadership practices, their cultural recognition and responsiveness, nor the quality of relationships they hold amongst their school community. Research into educational inequalities at the individual student level, was extensively studied during the 1960s and 1970s (Coleman, et al., 1966; Miller and Woock, 1970; Jencks, et al., 1972; Thorndike, 1973; Havighurst and Neugarten, 1975; Bowles and Gintis, 1976). A brief overview of this historical research is synthesised under the following sub-headings of social class and family background, gender, race and ethnicity. While this historical research does not focus on the contextual factors influencing educational inequalities (this emerged from the mid-1970s and is included later on in this chapter) nor governmental education reforms, it does illustrate some major findings from which generalisations and labelling of student success and failure have formed.

2.2.1 Social class and family background

Within the USA, UK and NZ, a system of societal stratification exists where groups are classified along identifiable dimensions. Although, individuals living in these democratic countries may deny

that 'social class' exists, traditional research into education performance during the 1960s and 1970s included data on the "social class" of the students (Coleman, et al., 1966, p.7, pp.643-656; Miller and Woock, 1970, p.45; Jencks, et al., 1972 p.22, pp.35-36, pp.78-81, pp.103-106; Thorndike, 1973, p.177; Havighurst and Neugarten, 1975, pp.14-38; Bowles and Gintis, 1976, p.67) . This data was collected through surveys completed by students that included questions on their family and home environment. These answers provided the researcher with socio-economic information from which patterns of education achievement emerged. Therefore, educational inequalities were identified between different groups within society, from which a classification system, according to the occupational status of the student's father, was formed. Social classes were found to be important in the USA because individuals within society relate to each other in groups not as individuals (Bowles and Gintis, 1976).

To further understand how the structure of social class was calculated and how it relates to education, Joseph Kahl (1957 cited in Miller and Woock, 1970, p.46; and cited in Havighurst and Neugarten, 1975, p.20) identified seven major dimensions of American society:

1. Prestige. Some people in the community have more personal prestige than others and are regarded by others with respect.
2. Occupation. Some occupations are considered higher than others partly because they are more important to the welfare of the community, partly because they require special talents, and partly because they pay high rewards.
3. Possessions or wealth or income.
4. Social interaction. In a large community everyone cannot interact with everyone. Patterns of differential contact arise and people are most comfortable with "their own kind."
5. Class consciousness. The degree to which people at given levels are aware of themselves as distinct social groupings. Americans are said to be less class conscious than Europeans, yet Americans, too, think of themselves as working class, or middle class, and a large proportion identify on the side of management or on the side of labor.

6. Value orientations. People differ about the things they consider different or important, and groups of people come to share a limited number of abstract values or value systems.
7. Power, or the ability to control the actions of other people. This variable, while it is important in determining social class, cannot be measured directly. It can be studied indirectly, however, by delineating the clique of important people in the community or by studying the people who control the capital wealth of the community.

Although the first six dimensions may be considered independently, all seven are interdependent; they interact to form the basis of the social-class structure which is shown in Figure 2. The socioeconomic status of the family or an individual is based on income which is a dimension of social class. It is important to note that social class is a group concept and makes sense only for large groups when analysed as a whole, while individual performances will fluctuate about the group mean (Miller and Woock, 1970). The largest social classes (Figure 2) are the working class and middle class with 30% each, while the capitalist class, structured above the upper middle class, represents the smallest group. The distribution of wealth in the USA is also uneven with the top 1% of households in the United States owning 33% of the nation's wealth (Figure 3). According to Simons (1980, p.8) "social class predicts achievements, school grades, I.Q. scores, retention at grade level, truancy, course failure, and many other aspects of educational participation" highlighting the educational inequalities between social classes.

Social class directly influences educational achievement through two processes. First, educational attainment is directly related to an individuals' parental social class or 'class of origin'. Secondly, although ability is a major factor in determining educational achievement when coupled with social class a disparity occurs as able students from upper middle class families are likely to achieve a university degree, while able students from working class families have less chance of entering a

university and achieving a degree even when they have high ability. Through analysing these two processes we can further understand how social class influences educational inequalities.

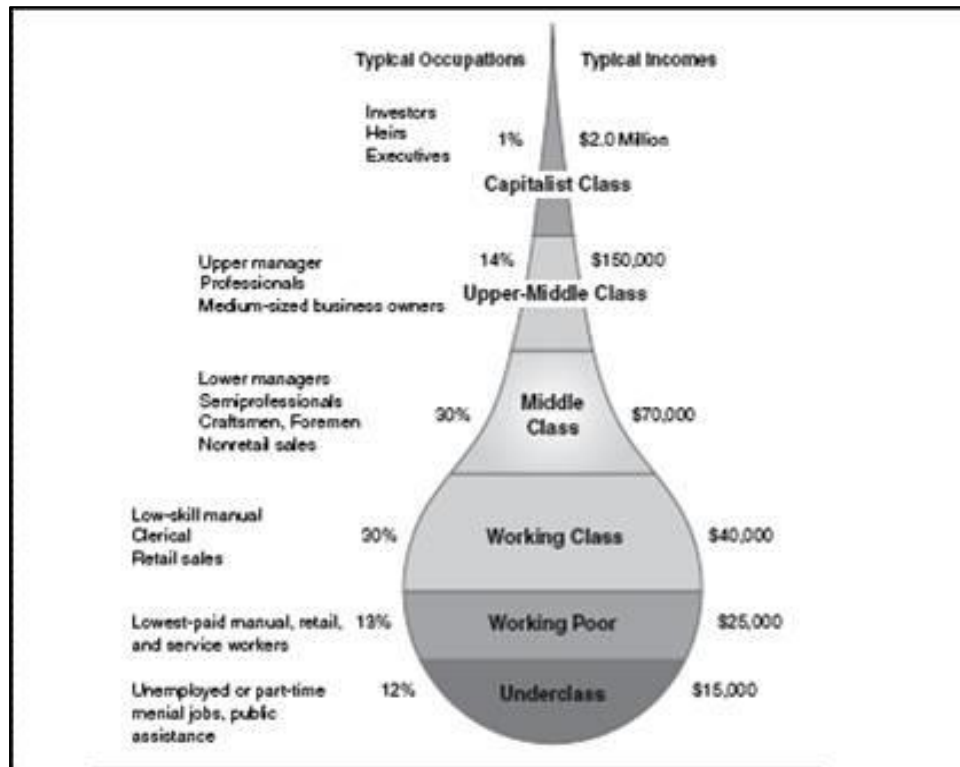


Figure 2: Social Class Structure in the USA. (Gilbert, 2008)

Process 1: Social class of origin and educational achievement

International studies into student achievement, now known as the Programme for International Student Assessment (PISA) first started in the 1960s. The International Association for the Evaluation of School Achievement (IEA) conducted a worldwide study between 1967 and 1974 in twenty countries (including Australia, Chile, England, Finland, Hungary, India, Iran, New Zealand, and USA) examining the socioeconomic, cultural, and educational factors related to achievement in learning to read and comprehend the mother tongue. Information was gathered from 250,000 students aged ten, fourteen and pre-university. They were tested with identical, but standardised, local-language versions of tests in mathematics, reading, science, and literature. The countries

varied in their average scores on the standardised tests, but within each country it was found that the scores were related to the socio-economic status of the students (Thorndike, 1973). In evaluating the findings, Thorndike (1973, p.177) summarised that in “developed countries an appreciable prediction of the reading achievement of individual students is provided by information about their home and family backgrounds”. When a child comes from a home where parents are educated, in which books and magazines are available, and in which the media of radio and television are accessible then this child is a better reader.

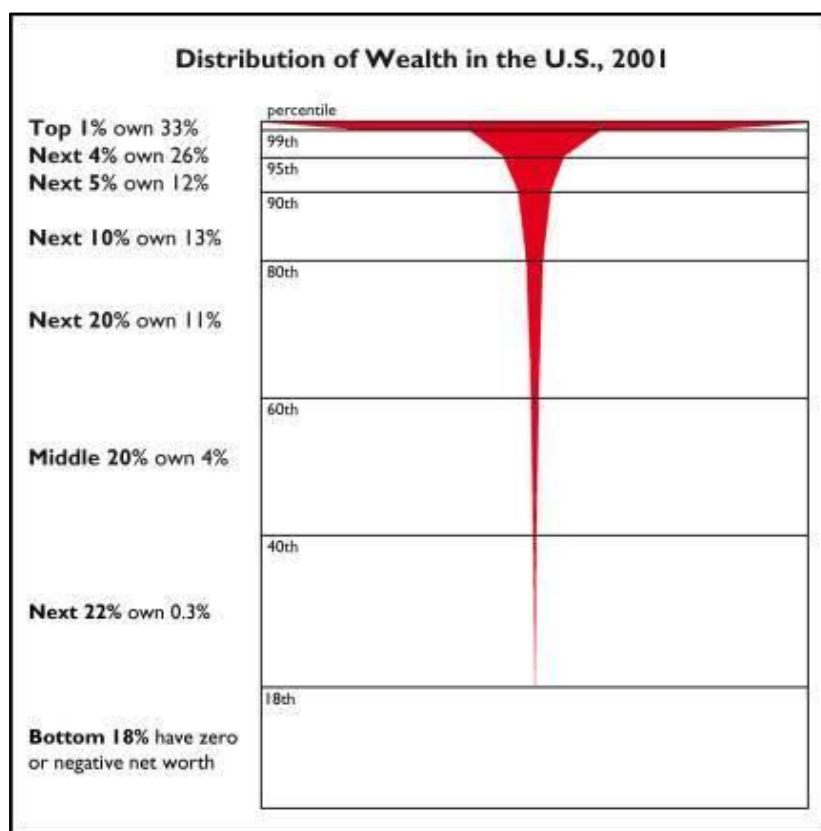


Figure 3: Distribution of Wealth in the U.S., 2001. [image online] Available at: <<http://uncgsoc101.wordpress.com/module-6-social-stratification/>> [Accessed 07 April 2013]

National studies into student achievement have been researched in a number of countries including Scotland. Data collected from the 2001 Scottish Household survey (Table 1) shows more than 1 in 3 individuals from an unskilled manual background had no qualifications, compared to 1 in 16 of those

from a professional and managerial social class (Iannelli and Paterson, 2005). While almost half of the individuals with parents in professional and managerial occupations attained a degree compared with 1 in 12 people with parents in unskilled manual occupations. Research by Iannelli and Paterson (2005) found although there has been an increase over the last half century in the proportions of people from all social classes of origin reaching higher educational qualifications. Educational expansion has benefited all social classes equally without reducing social inequalities. This means some working class children are achieving educational qualifications higher than their parents, but proportionately, so are children from middle class families. With more individuals with higher qualifications this correlates with the present day market economy where the expansion of

Table 1: Educational attainment by class of origin (people aged 25-64, in percentages) in Scotland

	Class of Origin				
	Professional Managerial	Routine Non-Manual	Petty Bourgeoisie	Skilled Manual	Unskilled Manual
No qualification	6.0	13.5	19.5	25.8	37.1
Lower secondary	16.0	25.8	25.9	28.9	31.8
Upper secondary	20.2	25.1	21.4	21.3	17.0
Sub-degree	10.6	9.2	8.6	8.1	5.7
Degree	47.2	26.3	24.7	15.9	8.4
Number of cases (unweighted)	1980	1285	784	1904	2345

Source: (Iannelli and Paterson, 2005, p.3)

professional jobs has led more people from working class backgrounds into employment held by the middle class. Overall, Iannelli and Paterson (2005) found the gap had not changed and the origin of a student's social class has continued to influence their educational achievement. Research into

student achievement within a working-class community in east London identified cultural aspects that do not support ambition in education. Benn and Millar (2006, p.23 cited in Wilkinson and Pickett, 2009, p.105) state that “one of the biggest problems facing British schools is the gap between rich and poor, and the enormous disparity in children’s home backgrounds and the social and cultural capital they bring to the education table”. Working-class culture of Bermondsey, in east London is described by anthropologist Gillian Evans (cited in Wilkinson and Pickett, 2009 p.115) where becoming educated would require them to give up ways of being that they value. According to Evans, talking about abstract ideas, books and culture is seen as posh and pretentious, while talking about families, their health, housework, sex and gossip is seen as working class. While working class families want the best for their children, the word ‘best’ does not always mean ‘education’ even if the child has an intellectual ability to achieve in higher education.

Process 2: Social Class and Intellectual Ability

Social class is clearly indicated as an important factor in educational performance and the level of educational achievement. When youth of the same intellectual ability have unequal educational outcomes, it can be assumed that something other than intelligence is determining their school achievement. Research in the early 1970s (Havighurst and Neugarten, 1975) found only half of the working class students that entered college completed their four year programme. While youth from upper-middle class families are likely to go to college and complete a four year programme (Havighurst and Neugarten, 1975). Social class, it appears is the major factor responsible for much of the huge loss of potential initially from the education system and later from society.

The two factors, according to Havighurst and Neugarten (1975, p.68) that stop able youth from working-class families to continue their formal education lies “partly in the inability of many working-class youth to pay for a college education, and partly in the motivation for higher

education". It appears the education system selects able youth for college and university but operates less effectively to retain students from lower classes.

Research by Warren (2002) into 'Class in the Classroom' details the invisible forms of difference between social classes at college level. Warren (2002, p.1) found the "biggest factor affecting learning for lower class students is a lack of confidence based on real or perceived weaknesses in preparation". Lower class students often came to college with a lower level of academic skills and sophistication than their middle and upper class peers. Lower levels of academic skills between students of the same ability are related to the geographical variation in the quality of schools and their resources, which vary between residential areas based on class lines (Williamson and Byrne, 1979). This educational inequality directly affected the performance of lower class students in the classroom and of their ability to do well in higher education. Uncertainty in the classroom led lower class students to be quieter and less visibly engaged in classroom encounters (Warren, 2002).

With some lower class students, their quietness was a result of their accent, neighbourhood dialect and vocabulary levels (Warren, 2002). These factors distinguished them from the upper classes. Lower class students were often embarrassed about their position. With other lower class students their quietness was due to tiredness and lack of study as they were also working to pay for course fees.

Warren (2002) also found lower class students tend to be less able to work the system. They had trouble finding courses and majors that addressed their interests and needs and acknowledged their experiences. Lower class students, unwilling to speak up, also found difficulty in navigating rules and regulations, finding out what should be available to them, and finding the right people to help them. All these factors contributed to their uncertainty and lack of confidence, which in turn results in students not completing their college education.

In comparison, Warren (2002) found middle class students to be more confident than lower class students. Middle class students were fairly well prepared for higher education. They assumed they would succeed and were prepared to work hard. While, upper class students came to college most confident, best prepared, and they tended to be ambitious and value success. Upper class students were confident of their place and were likely to speak up in class. Their social and economic safety net provided them with the ability to take risks and assume that their ideas would be heard.

On the positive side, Warren (2002) found successful students from lower and working class backgrounds were found to be aware of the value of higher education, tended to be highly motivated, knew how to work hard, and have a clear sense of purpose. They were found to be loyal to their class background but eager of moving up to the middle class. (Warren, 2002)

2.2.2 Gender

When educational inequalities were first examined in the 1960s, the effects of being a male or a female pupil were not considered relevant to educational performance (Chapman, 1986). Published research into educational inequalities during the 1960s and early 1970s, do not include headings focussed on 'gender' or 'sex' (Miller and Woock, 1970; Jencks, 1972; Thorndike, 1973;) Sociologist, James Coleman (The Coleman Report) included tables with data lines of 'girls' and 'boys' but they were not objectives of his research and there was no specific analysis of gender (Coleman, et al., 1966). Sociology did evolve over the following thirty years, as a heading titled 'Gender and the education system' is included in Giddens (1993, p.443) where he describes patterns of gender inequality in schooling as related to contextual effects and not associated with the individual student or their social class.

Historically, a boy was educated to be a complete human being with a world-wide interest, while a girl needed to be trained exclusively for wifehood and motherhood (Boyd and King, 1972; McCulloch, 1998). This social construction of gender was a formal living process in the school curriculum where gender differences in subjects taken illustrate a pattern of option choice which reflects informal processes displayed by role modelling (Chapman, 1986). Gender conditioning in schools is the contextual effect referred to by Giddens (1993) which may also suggest sexual discrimination within the school environment.

Historically, higher education was for men but research now shows a reduction in the education inequalities between genders due to diversity within the tertiary education sector. Research by Iannelli and Paterson (2005) in Scotland found that over the last fifty years, the chances of gaining a degree have increased for women. This has been related to the introduction of a comprehensive secondary education at schools which has benefited working-class girls more than working-class boys. Also, institutional changes and expansion within the tertiary sector during the 1980s led to more women from working class origins attending non-university facilities and achieving their degree. Women in position of power during the 1980s have also benefitted working class girls through de-constructing gender roles and positive role modelling.

2.2.3 Race and ethnicity

The rise of talented people within many modern societies has often been rejected on the basis of their racial and ethnic differences. For human geographers, 'race' is not a category which picks out distinct groupings of human beings who display different patterns of human characteristics of behaviour. "The belief that human beings can be readily divided into a series of discrete races is now widely regarded as fallacious" (Johnston, Gregory, Pratt and Watts, 2000, p.669). Race is defined by an individual's skin pigmentation whereas 'ethnicity' is a distinct group by which

individuals identify themselves with. The problem for researchers is how to measure differences between ethnic groups and the implications of this categorization. In education, the concern for ethnic categorization is the implication of discrimination, especially as achievement does not often account for significant cultural variations between the groups. When ethnic variations in educational achievement do occur that are not simply a function of social differences between ethnic groups, then this inequality could reflect ethnic discrimination.

Research on ethnic discrimination in education first began in the USA during the Civil Rights era in the early 1960s. The 1964 Civil Rights Act in the USA (section 402), required the United States Commissioner of Education to conduct a survey and make a report “concerning the lack of availability of equal educational opportunities for individuals by reason of race, color, religion or national origin in public educational institutions at all levels in the United States” (Coleman, et al., 1966, pp.iii). James Coleman, a sociologist, was appointed director of the research and results were published two years later in 1966. Information was collected from more than half a million pupils across the USA and sixty thousand teachers. This extensive research investigation provided a general survey of schooling in the USA. In carrying out the survey, attention was paid to six racial and ethnic groups: African Americans (referred to as ‘Negroes’ in this report), American Indians, Oriental Americans, Puerto Ricans, Mexican Americans, and Whites. The final report contained 737 pages and was titled ‘The Equality of Educational Opportunity’ often referred to as ‘The Coleman Report’.

The Coleman Report starts by documenting the achievement gap between minority (non-white) and majority (white) children. School facilities were, unexpectedly, found to be substantially the same in all schools, minority and majority, across the USA and did not exert a significant influence on educational inequalities (Blumenthal, 1967). Coleman, et al., (1966, p.325) found

“that schools bring little influence to bear on a child’s achievement that is independent of his background and general social context”. For “equality of educational opportunity through the schools must imply a strong effect of schools that is independent of the child’s immediate social environment, and that strong independent effect is not present in American schools (Coleman, et al., 1966, p.325)”. Hence, a student’s social class and home environment was far more important than the school for understanding student outcomes (Borman and Dowling, 2010). Coleman, et al., (1966) found that two processes, that of poverty and racial segregation, influenced educational inequalities of African American students (Blumenthal, 1967).

Lower achievement rates are linked with poverty and poverty exists within minority groups. Coleman, et al., (1966) found that minority children entered school at a lower achievement level than whites and fell further behind as their schooling progressed when attending highly segregated schools. In 1966, a vast majority of African Americans were poorer than most working class Americans and the African American middle-class was all but non-existent (Blumenthal, 1967). Students from poorer households must work harder to overcome the influences of their home environment, which may include parents with low school achievements that in turn lack ambition for their children.

Jencks, et al., (1972) research found in the USA, the average white child scores about 15 points higher on standardized tests than the average black child, implying the differences attributed to genes, environment or both. Further research by Jencks, et al., (1972) into the disparity between test scores found that the differences were largely environmental. The average black child was achieving lower rates than the average white child due to the high poverty in black households. When poverty existed in a household this had an impact on the educational achievement of school

age children living in that household. Sadly, Jencks et al., (1972) found that blacks and whites with equal test scores still have very unequal occupational statuses and incomes.

In the United Kingdom, the Swann Report of 1985 researched the relationship between ethnicity and educational achievement. Results showed that only 5 per cent of West Indian school-leavers obtained one or more passes at 'A' level in 1981-2, compared to 13 percent of the white population. West Indian pupils came disproportionately from poorer backgrounds which were found to partly influence this educational inequality. (Giddens, 1993)

Coleman, et al., (1966) reported that a majority of children were in schools segregated into races of black and white, where 65% of all blacks and 80% of all whites attended schools filled 90% by their own race. Therefore, in almost 80 per cent of schools attended by white students, black students accounted for only 10 per cent or less of their numbers (Giddens, 1993). Coleman, et al., (1966) noted that among minority groups, black children were by far the most segregated. As children often attend the neighbouring school, schools filled with a majority of black students reflect a community housed with black residents. Racial segregation had led to lower educational achievement in black and minority ethnic groups in the USA. When African American students were in classrooms where most of the students were white, the test average of the African American students was higher, regardless of social class. More importantly the survey data showed that white students who first attended integrated schools early in their school careers were likely to value their association with African American students (Coleman, et al., 1966, Table 3.3.4 and 3.3.5 p. 333). School segregation and residential segregation had excluded 'whites' from observing and understanding the problems and lifestyles of other ethnic groups in the USA and effectively removed contact between 'whites' and 'blacks'. This 'societal lack of ethnic mixing' is a major influence in racial and ethnic discrimination between ethnic groups.

To summarise this section on race and ethnicity, the processes that led to educational inequality between ethnic groups in the USA were *not* found to be a result of school resources but were partly caused by the effects of poverty (low socio-economic status or low social class) and racial/ethnic segregation. When students of poverty and colour are placed in classrooms with fellow students of the same backgrounds, they all lack examples of ambition and achievement. Together their progress becomes almost impossible but as Coleman's USA data suggests racial mixing within the classroom and school environment was essential to improving African American education and subsequent occupational statuses, regardless of social class.

2.3 Educational Input No.2: The School

As the environment in which one lives has a significant impact on their quality of life, accordingly, the design of cities and the availability of quality education is fundamental to the health, prosperity and happiness of its citizens. Throughout the world, achieving qualifications that will gain entrance to a university can assist students to earn an income that can provide prosperity in their lives (whether or not they attend university). This income may determine the type of housing they will eventually live in which may then directly impact on their health, but moreover, this income derived from education may determine their individual social class, regardless of their parental social class, and improve their life choices.

Three models explaining educational inequalities between schools are detailed by Jencks and Mayers (1990) as institutional, epidemic and collective socialization. Their geographical influences are broad based and encompass the interaction between students and places. The 'Institution Model' emphasises the role of the family and community outside of the school and suggests that we may understand the impacts of high-poverty and segregated communities by looking to the schools

serving the communities (Borman and Dowling, 2010). The 'Epidemic Model' assumes that good or bad behaviour is contagious and that interactions among students are important mechanisms for shaping academic achievements, thus emphasising peer influences and how schools affect individual students (Borman and Dorling, 2010). The 'Collective Socialization Model' holds that the social networks and relationships between adults and children within a school and neighbourhood are important resources from which students may benefit, emphasising the role of outside adults often referred to as the 'social or cultural capital' of the school (Borman and Dorling, 2010). International research indicates there are many factors influencing educational inequalities which can be also viewed through a sociological theoretical perspective.

The growth of schooling and the provision of specialised mass schooling are of interest to sociologists who view education as one of the central social institutions of any modern society (McLennan, Ryan and Spoonley, 2004). Sociological theories in education reflect societal changes through a number of perspectives. Functionalist theories of school and society trace their origins to the classical sociology of Emile Durkheim (1858-1917). For Durkheim, the processes of industrialization, urbanization, and modernization led to the breakdown of traditional rituals and methods of social control, which led to the breakdown of social solidarity and cohesion (Sadovnik, 2007). Durkheim's emphasis on values and cohesion set the tone for how present-day functionalists approach the study of education and the maintenance of social order within the school.

Functionalists examine the specific purposes of schooling and their role in society. Through this sociological perspective, schools function within the interests of the majority of citizens, whereas, an alternative perspective called 'conflict theory' argues that schools function in the interests of the dominant groups in a society. Conflict theorists believe society is held together by the ability of dominant groups to impose their will on subordinate groups through force, co-optation, and

manipulation (Sadovnik, 2007). In this view, the dominant groups hold economic, political, cultural and military power. In a modern capitalist country, the dominant group in a government school would be the role of the State and its education policies. A third perspective called 'critical theory' stresses the examination of society and culture by combining knowledge across the social sciences and humanities. These three sociological theories provide geography with further perspectives in examining educational inequalities.

Durkheim argued that education was important for the transmission of societal norms and values. Marxist theorists claim that schools treat students unequally, and do so in the interests of industrial capitalism where the main role of education is to reproduce labour power for employers (Bowles and Gintis, 1976). Bowles and Gintis argue that "schools help to motivate some individuals towards 'achievement' and 'success' while discouraging others, who find their way into low-paid jobs" (1976, cited in Giddens, 1994, p.436). Within this educational input of the 'school', the role of each school differs depending on each school's distinct social environment which may or may not influence educational inequalities. Researchers find that schools located in low socioeconomic status (SES) areas are at risk of reproducing class inequalities.

Within the educational input of the school, there are four processes that influence educational inequalities. The first looks at the unequal distribution of resources and opportunities within a school. The second process involves the social and ethnic composition of the students and how they reinforce methods opposing educational achievement which influence educational inequalities. Third, is the school's social and cultural capital, referred to also as the 'collective socialization model' which can influence and benefit students through social networks and relationships between adults and students within a school and its community. Finally, by studying the school as a place, one can analyse the school's distinct social environment that influences educational inequalities through the

‘school effects’ of broader societal context that integrates the three processes of context, composition and social capital (Herbert, 1976).

Process 1: School Resources (financial and classroom based)

Schools are measureable through comparing the distribution of financial and classroom-based resources. Financial resources include the overall per-pupil expenditure, the number of specialised classrooms for science and technology curriculum areas, library books and facilities. Classroom-based resources include attributes and values of the teacher and the theories behind their teaching method. Together they form the traditional primary model for educational inequalities where these factors have been used to predict differences in student’s outcomes. (Coleman, et al., 1966; Jencks and Mayer, 1990; Borman and Dowling, 2010)

Early research into the unequal provision of school resources was conducted in the USA, UK and NZ. In the USA, The Coleman Report (Coleman, et al., 1966) predicted that unequal provision of school resources was the major cause of differences in education opportunity but the report’s overall findings were that schools resources did not greatly influence educational outcomes. Bondi’s (1987) UK research into resource allocation in Manchester’s primary schools found a general pattern of “successful direction of extra resources to the most disadvantaged schools (p.341)”. The effectiveness of positive discrimination in the provision of primary school educational resources in Sheffield, UK were researched by Pattie (1986) and found to be also ‘successful’ during a time of education reforms; where political budgets were at a standstill. But these ‘successes’ in primary school s are not linked to any student performance outcomes. In the English city of Sunderland, the geographical variations in the quality of schools were found to be closely related to the spatial patterns of educational attainment (Williamson and Byrne, 1977 cited in Williamson and Byrne, 1979, p.197). But no controls were made for school SES so no firm conclusion as to the independent

effect of school resources on attainment could be made. King's (1974) research shows that secondary schools located within deprived areas had better pupil/teacher ratios than schools in less deprived areas, but this ratio had no corresponding positive effect on student's examination results.

In New Zealand, Thrupp's (1997) research recommended a constructive intervention process of increasing the resources available to low SES schools and introducing measures to resource working class schools, to help improve the school outcomes and life chances of many working class students. Government schools operate through government funding but many government schools in New Zealand also rely on parent donations. Parent donations give the school more purchasing power, which unfortunately are more likely to be paid to the wealthier SES school. Lower SES schools often struggle to have their parent community pay school donations, which in turn, cause further inequalities of school resources between schools.

In summary, while this early research generally concluded that schools don't matter in terms of pupil achievement, this conclusion was suspect given the simple methodology used. Research discussed later in the section suggests that their early conclusions were flawed.

Process 2: School social/ethnic composition and the 'school-mix' effect

A school's composition reflects the social class or socio-economic status of its students. Thorndike (1973, p.177) states "when the population of a school comes from homes in which the parents are themselves well educated, economically advantaged and able to provide an environment in which reading materials and communications media are available, the school shows a generally superior level of reading achievement." A whole school approach could also be applied to achievement as school outcomes are determined by the composition of students that attend the school.

How a school's composition affects individual students can be described through the sociological 'epidemic model' which assumes that good or bad behaviour is contagious. Interactions among students and peer influences are mechanisms for shaping academic achievements (Borman and Dowling, 2010). One hypothesis is that school mix has an effect through reference group processes, i.e. the attainment of a student might somehow be raised by informal contact with higher SES peers in the middle class schools. Instructional processes may also occur because students are exposed to higher quality instruction in middle class schools. When schools have enrolment zones that draw a boundary line along roads in the surrounding area, the schools will contain 'real-life' examples of the neighbouring community. To glimpse the levels of deprivation in a community is to observe the local school children. A school then acts as the sociological 'Institutional Model' which provides a deeper understanding of the community.

Early research by Jackson and Marsden (1962) into socio-economic mixing of working class students with middle class students in the English town of Huddersfield claimed that working class children derived some benefit from close contact with middle class children. The social class composition of school students in the town was estimated to be 36% working class and 64% middle class (Jackson and Marsden, 1962). Results showed that successful working class children came from areas where the classes were mixed and that they had directly benefitted from the aspirations of the middle class children.

In New Zealand, a number of studies have supported the beneficial effects of school social mix upon achievement. Simons (1980) found that pupils from lower income families not only performed better in more socially mixed schools but also had higher occupation aspirations than their peers in lower income schools. Similarly, in a qualitative study of four schools of varying social class composition, Thrupp (1997) found evidence to support a whole school explanation for a school mix

effect stemming from the cumulative effects of reference group, instructional and organisation/management processes. Unfortunately, the opposite may also occur when students of high economic backgrounds attend low decile schools, their academic achievement results are lower than what they may have achieved at a high decile school (Simons, 1980). Thrupp (1997) recommended that addressing the effects of school mix effect should be part of the policy agenda for reducing educational inequality.

The ethnic composition of USA schools rapidly changed during the 1970s and 1980s with the decision to transport by bus African American students away from their neighbourhood into predominantly white schools (Kluger, 1975). Busing of students to speed up the desegregation process was in response to the findings of the Coleman Report (1966) and the 1954 'Brown v. Board of Education' U.S. Supreme Court decision that declared racial segregation illegal in the United States (Adams, 2008; Pettigrew, 2008). Coleman, et al., (1966) concluded that socially disadvantaged black children benefited significantly from learning in mixed-race classrooms, partly because these were also more mixed socio-economically, so by busing, as opposed to increasing funding to segregated schools, was necessary for education equality. Under federal court supervision, many school districts across the USA implemented mandatory bussing plans. (Massey and Denton, 1993; Orfield, 2001; Godwin, et al., 2006; Pettigrew, 2008)

Five decades after the landmark 1954 school desegregation case of 'Brown v. Board of Education' research into how school racial composition directly affects educational found that black pupils performed worse in schools with a higher proportion of black pupils (Hanushek, Kain and Rivkin, 2009). Results indicate that policies that support the continued suburbanisation of black Americans and the slow but steady decline in black-white segregation would lead to improving schooling outcomes and the decline in the racial achievement gap (Hanushek, Kain and Rivkin, 2009).

Process 3: Schools' Social and Cultural Capital

Coleman (1990, cited in Foley and Edwards, 1997 pp. 552) found social capital to be any sort of social relation that provides a resource for action. Social networks and relationships between adults and children within a school and the school's community can provide resources which may disadvantage or benefit a student. Good examples of social capital within a school are an active Parent Teacher Association (PTA) who set an agenda to raise funds for a specific purpose within the school. The funds may purchase sports equipment, for example, or new library books and computers that would otherwise be purchased through operating funds or school donations from parents.

Cultural capital has been described as "a system of deeply internalised values which determine attitudes towards educational institutions" (Bourdieu, 1973 cited in Chapman, 1986, p.30) and as a part of student experiences and treatment within the school environment (Coleman and Hoffer 1987; Lareau, 2002; Delpit, 2006; Khalifa, 2010). Bourdieu argues that children in schools are assessed according to how well they have absorbed the dominant culture within the school. If they "possess cultural capital which corresponds to the demands of the school, they will be rated as 'intelligent'" (Chapman, 1986, p.30). As cultural capital can also describe the strength of social relationships within the school and its community, an example of cultural capital may be an adult or parent, for example, that is able to teach the students an art form that provides a tactical or visual experience of a curriculum area that would be otherwise taught through reading and writing. Cultural and social capital explains educational success through relationships and experience rather than wealth and class (Chapman, 1986).

Human Capital Theory describes education as an investment in people and treats its consequences as a form of capital. As education becomes a part of the person receiving it, human capital theory provides a perspective of viewing education as an economical productive service. Education and

training increase an individual's cognitive capacity, which in turn tends to increase an individual's earnings. Individuals that increase their measure of human capital through secondary school education may further their education to tertiary level. (Olssen, 2002).

Associations and groups that support schools through volunteers, providing resources or finance, increase that school's social and cultural capital. They become 'associated' with the school and in turn both parties may benefit. Working organisations that support school leavers with work experience prior to leaving school, enable students to make real decisions about their career choices (Hemmings, 2007). Schools that keep in contact with school leavers may find that once that 'ex-student' has achieved in their specific area that are happy to return to their school and talk voluntarily to current students on their accomplishments. All these factors add social and cultural capital to a school which may provide students and teachers with a strong sense of identity with the school and raise student achievement (Jackson, 2010). A school is also a community and its ability to recover from a disaster can be attributed to disaster resiliency and social capital (Rivera and Settembrino, 2013; Kapucu, Hawkins, Rivera, 2013).

Process 4: School Effects

'School Effects' combine the influences of school resources, social composition, and the social and cultural capital within the school environment. Public discussion of education in the 1960s and early 1970s debated the concern of 'equality of opportunity and equality of outcome' (Williamson and Byrne, 1979, cited in Bradford, 1989, p.142). This early approach to researching and understanding educational inequalities narrowly focussed on individuals and their social factors, while now we research schools as places and spatially examine the geographical features of what this location is (Tunstall, Shaw and Dorling, 2004). In determining education achievement outcomes, the socio-economic data of a location provides spatially dependent assumptions – unemployed people tend to

be living near other unemployed people, and unemployed people tend to have low levels of school achievement. However, studying this same location as a 'place' provides us with information on how this place is constructed and how it may be interrelated with other places especially when this place surrounds a secondary school with low student achievement. According to Tunstall, Shaw and Dorling, (2004) "places form people as much as places are formed by people" and "places exist only in relation to one another". Their influence on education performance and how they in turn are influenced by education is dependent on those links.

Within the school environment, most children in richer countries do not aspire to low-skilled work but instead aspire to higher-status jobs (Wilkinson and Pickett, 2009). But the influences within the school environment or context, determine the educational achievements that students aim towards. This influence is known as 'place' or as 'school effects'. Collective behaviour becomes the normal within the school's social context and although students may aspire for 'greatness', it may not be until they leave school that they realise they will never achieve this, as their level of education does not provide them with the qualifications required.

The findings from The Coleman Report (1966) have shaped the sociology of education, national education policies, and wider public and scholarly opinion regarding the contributions of schools and schooling to equality in the United States (Borman and Dowling, 2010). The Coleman Report's analysis was indicative of research in the 1960s and early 1970s where data was focussed on individuals and their social factors. Forty years later, and in response to The Coleman Report (1966), multi-level modelling analysis, with a micro (within-school or student-level) and macro (between-school, or school-level) component was conducted by Borman and Dowling (2010). The research objective was to determine whether Coleman and his colleagues would have reached the same conclusions had they had available today's statistical methods and theories. Their research design

was to determine how schools and students' family backgrounds contribute to learning outcomes. Using the original Equality of Educational Opportunity data, this study replicated Coleman's statistical models but also applied a two-level hierarchical linear model (HLM) to measure the effects of school-level social composition, resources, teacher characteristics, and peer characteristics on ninth-grade students' verbal achievement data. Borman and Dowling (2010) found that schools do matter because when one examines the outcomes across the national sample of schools, fully 40% of the differences in achievement can be found between schools. Even after statistically taking into account students' family backgrounds, a large proportion of the variation among true school means is related to differences explained by school characteristics also known as 'school effects'. More specifically, multi-level analysis of a sample of Coleman's data found that both race/ethnic and social class composition of a student's school was 1.75 times more important than a student's individual race/ethnicity or social class for understanding educational outcomes. In contrast with the Coleman Report findings that "schools bring little influence to bear on a child's achievement that is independent of his background and general social context (1966, p. 325)" analysis of the same data by Borman and Dowling suggests the social context of one's school and neighbourhood as a central problem to the equality of educational opportunity. In contrast to previous analyses of the Coleman data, findings by Borman and Dowling (2010, p.39) reveal "that school context effects dwarf the effects of family background". Coleman, et al., (1966) did however say that socially disadvantaged black children benefited significantly from learning in mixed-race classrooms, so by busing, as opposed to increasing funding to segregated schools, was necessary for education equality.

The focus on studying places was shown by Herbert (1976, p.123) in that "schools cannot be divorced from their broader societal context". Within each school a distinctive social environment

exists. Outside each school, there are other environments of importance – home, neighbourhood and peer groups. Each environment has some effect and makes some contribution towards educational attitude and performance. The links between home and school and between community and school illustrates the interaction effects between the student, their home and their school. Through focussing on places rather than just people we can study the relationship between inequalities and student achievement in a place within the school community of a school with low levels of student achievement. If no relationship exists then intervention must target the school environment. If there is a relationship then we need to know what it is about the place that influences education performance. (Herbert, 1976)

The location of a new government school is determined by demand (the market or the school aged child) and government funding. These three interdependent parts of the state, the school and the student, form educational inputs where outputs are described in terms of student or school achievement. The complex system of educating is subject to government legislation and education reforms. Education Acts make it compulsory for school age children to attend school but due to government policies, parents do not always have power to choose which government schools they wish their child to attend. The next section looks at the role of the government in education how this education input has system power to improve student outcomes.

2.4 Educational Input No.3: The State

There was a time in Western societies when neither educational nor any other forms of inequality was regarded as a social problem, not just by those in power but even by most of the population. In the Middle Ages, for example, differences in social status, wealth and power, and the inheritance of

these, were generally treated as facts of life. It was not until the seventeenth century onwards and the role of institutionalized Christianity through the industrialised world that the idea of 'all human beings being born equal' enabled individuals to take the opportunity to rise within the social order, according to their talents. (Foster, Goom and Hammersley, 1996)

The first school in England, was established by St Augustine at Canterbury in the year 598 (www.educationengland.org.uk). It is presumed that the Romans schooled their children during occupation but no formal schools remained once they left England in the third century. Christianity needed priests and boys to sing in the choir, so St Augustine established two types of school: grammar school to teach Latin to English priests, and the song school (which some cathedrals still have today) where boys were trained to sing in cathedral choirs (www.educationengland.org.uk). The early colonists in the USA founded the first school in Boston during 1635 (www.bls.org). While in New Zealand, the missionary Thomas Kendall founded the first school in 1816 at Rangihoua in the Bay of Islands (www.teara.govt.nz). However, it was not until the late nineteenth century that Government and State legislation established national systems of primary school education throughout the United Kingdom, the USA and New Zealand.

In the USA, early selective processes in schooling developed racial segregation. Education policies of each State reflected the social mixing of ethnic groups within their State. Public school segregation was legislated in several southern states in the USA and still required by law in 1954. As the Coleman Report found, racial segregation in public schools directly contributed towards unequal opportunities in education which led to educational inequalities.

In New Zealand, early selective processes in schooling developed residential segregation. New Zealand's first free national system of primary education was established with the passing of the Education Act 1877, where it became compulsory for children from the ages of 5 to 15 attend

primary school. Nothing in the 1877 Act was binding to the indigenous Maori population, but any Maori was at liberty to send his children to a public school on condition that he accepted the regulations under which that school operated (Cumming and Cumming, 1978). The Education Act 1914 required all secondary schools to offer free education to all those who passed a proficiency examination (Neven and Thompson, 2011). The first secondary schools were developed by either the State, the Roman Catholic Church, or various Protestant Churches. A majority of the early secondary schools were located near high status residential areas and were elitist by the curriculum they taught, the values they upheld and the fees they charged (Murdoch, 1943). All early schools were developed upon socially selective principles. (Simons, 1980)

In New Zealand, each group had a specific reason and unique philosophy behind the establishment of their schools, and these were expressed in both the character and location. Primary education was promoted for all children, while secondary education was for the selected few (Simons, 1980). The introduction of secondary education in New Zealand introduced education inequalities in urban areas where higher education was not available to everyone. Large numbers of children received primary education and may have made good use of secondary education had it been available to them. The location of secondary schools therefore directly contributed to the growth of residential segregation in New Zealand's urban communities which still exists today.

In Britain, compulsory education was first established in 1870 (Giddens, 1993). Between the late nineteenth century and the Second World War, successive governments increased expenditure in education, and more schools were built. Most schools were run by private or church authorities and education was not considered to be a major area for reform or government intervention (Giddens, 1993). Following the First World War, the lack of education for industrial workers led to a large growth in adult unemployment and political debates began on the issue of how to cater for working-

class children beyond the age of 12 (McCulloch, 1998). During the Second World War recruits to the armed forces were given ability and learning tests, and the results showed low level of educational skills (Chapman, 1986). Grieved with concerns about post-war economic recovery prospects, the British government began to rethink about the quality of their existing educational system (Chapman, 1986).

2.4.1 State intervention in education: the Welfare State, 1930s - 1980

During the 1930s, the State became an increasingly important institution, extending its power and influence substantially (Johnston, 1993). Following the Second World War, governments in the UK, USA and NZ, consistently raised income through taxes in order to purchase goods and services, and to make transfer payments to citizens through pension plans and the provision of education and health services (Johnston, 1993). The provision of welfare changed within the range of welfare services available because the provision of welfare was now central to state strategies and state survival following the Second World War (Painter, 1995).

Economically, the welfare state was seen as partly an investment by providing a better educated and healthier workforce. The previous absence of a minimum wage had left economies prone to crisis of under-consumption, in which an economic downturn could turn into a slump as increased unemployment reduced the demand for goods and services, which generated further unemployment and so on (Painter, 1995). By placing a 'floor' under the level of popular consumption, the downward economic cycle could be broken (Painter, 1995).

Politically, the welfare state was placed between the forces of capital and labour, allowing the continuation of private investment and profit-making, while supporting the working class. In Britain the Confederation of British Industry and the Trade Union Congress both worked with the

Government and this fitted well with the economic doctrines of John Maynard Keynes (Painter, 1995). Welfare states were limited in both time (the twentieth century) and place (Western Europe, the United States, the British Commonwealth) but met with approval around the world (Painter, 1995). The establishment of the welfare state experienced a relatively stable period of about thirty years (Pinch, 1997).

Before the Second World War, British children received an education according to their parents' wealth and social class. The Education Act of 1944, initiated several major changes, including free secondary education for all; raising the school-leaving age to fifteen; and a commitment to equality of opportunity in education (Giddens, 1993). The secondary education provided by the 1944 Act was intended as a solution to class inequality (Chapman, 1986). Until 1944, a vast majority of children attended a single school until the age of fourteen and opportunities for working class youth to attend secondary school or university were limited (Chapman, 1986). Generations of children were unable to pursue a secondary education. The 1944 Education Act was designed to change all this through equality of opportunity In the UK post-war recovery period.

While state intervention increased levels of educational opportunity by making state funded education now available to all social class groups, existing patterns of educational inequality continued. Research in the 1950s found secondary schools in the UK were class-biased and there was no significant increase in the numbers of working-class children attending secondary school (Floud, Halsey and Martin, 1956). The evidence of the effects of the 1944 Education Act forced the British Government to review the structure of the education system.

Research into the relationship between social class and success in student outcomes found evidence in three ministry reports completed during the 1950s and 1960s, The Crowther Report (1959) provided evidence that the early school leaving age was related to social class not academic

performance. The Newsom Report (1963) looked at the education of average and below average children and found serious examples of neglect in secondary schools located in slum areas of London. The Newsom Report argued that the future of the UK depended on better education for those of below average ability and recommended increased resources for schools located in working class areas. The Plowden Report (1967) was commissioned by the Education Minister in 1963 for a review of primary education and all its aspects and the transition to secondary education. By the time the Plowden Report was returned to the Ministry of Education, the change of government had occurred. Many of the extensive recommendations in the Plowden Report, including a quote from chapter 11 “selection should not rely on intelligence and attainment tests” have been introduced to the state education system in the UK and other welfare states.

Evidence of why educational inequalities were occurring was found through research into social class, variation in school resources and selective school allocation practices (Floud, Halsey, and Martin, 1956; Crowther Report, 1959; Jackson and Marsden, 1962; Newsom Report, 1963; Plowden Report, 1967, Halsey, 1973). Selective school allocation practices, for example intelligence testing, were a harmful labelling process. Students that tested below their age level were labelled ‘retarded’, often excluded from secondary schooling, and their home environment “was not considered worthy of investigation” (Chapman, 1986, p.23). It was not until research by Skeels (1966) into the influence of the home environment, rather than genes, on intelligence that researchers started looking at how intelligence is defined. Skeels (1966) longitudinal study provided evidence that when orphaned children tested as ‘retarded’ were provided a supportive home environment and early childhood education their I.Q. scores improved and many progressed to graduate from high school and become productive members of society.

In the USA, Bowles and Gintis (1972) found high I.Q. and high occupational status could be explained by social background not just inherited intelligence. They argued that, I.Q. serves to legitimise the class system and the social institutions which reproduce social classes; by attributing the possession of wealth to high I.Q., structural reasons for inequality of wealth are concealed (Bowles and Gintis, 1972, cited in Chapman, K, 1986 p.24).

Research into reading literacy levels of welfare states was conducted by the International Association for the Evaluation of Educational Achievement during the late 1960s (Thorndike, 1973). Students from countries with a long history of welfare state provisions did better than students from developing countries. Thorndike (1973, p.177) found “14 year olds in the developing countries seem almost illiterate”. Results from international studies provided evidence to the governments of welfare states that their intervention into education was effective although educational inequalities were still occurring. The education system within welfare states “is a service to all; anyone with talent who is prepared to work hard, can climb the ladder leading to wealth and status. All children have equal opportunities to climb that ladder. Factors such as class, race, and gender have no effect on success” (Chapman, 1986, p.39). True, secondary schools were available for all classes but barriers existed that did not support the working class children attending secondary school. The capitalist policies of the welfare states provided revenue in education for the recovery of their workforce following the Second World War, but to maintain wealth within the capitalist upper middle class there had to be a surplus employable population available.

The ‘market-orientated’ welfare states of the English-speaking world – the USA, Canada, Australia, New Zealand and the UK – had a limited commitment to full employment and a heavy dependence on trade (Therborn 1987, cited in Pinch, 1997 p.12). An unemployed ‘surplus’ population is seen as a

part of the working mechanism of the capitalist mode of production and necessary for the accumulation of capital (Braverman, 1974 cited in Williamson and Byrne, 1979 p.196).

Capitalist industrialised economies relied on crude oil, and Organization of the Petroleum Exporting Countries (OPEC) was their predominant supplier. When OPEC announced a decision to raise the posted price of oil in 1973, the economic effects were immediate and reversed the traditional flow of capital away from industrial powers to Middle East oil exporting nations which then commenced accumulating vast wealth. Put simply, the welfare state dependence on crude oil placed that country into an economic crisis which resulted in reduced spending to its citizens. In the mid-1970s between a quarter and a third of the GNP of the major European countries was dedicated to social expenditures (Pierson, 1991, cited in Pinch, 1997 p.11). Similarly in the USA, over 20 per cent of the GNP was being devoted towards welfare policies in 1981 (Pinch, 1997). The economic crises of the 1970s led to the dismantling of the welfare-corporate state structure during the 1980s.

This model of state intervention in education changed as a result of neoliberal reforms which occurred in many OECD countries which also influenced education along with other aspects of government intervention.

2.4.2 The Neoliberal State and education reforms

A theoretical framework to explain how the changing geography of the welfare state survived capitalism is explained through 'Regulation Theory' (Pinch, 1997). The key elements of this theory explains the influence of the state in capitalist societies, and suggests, that society consists of three interrelated levels of organisation: the 'economic', the 'political' and the 'social' (Pinch, 1997, p.69). Therefore, following the substantial dismantling of the welfare state in the 1980s, regulationists explain that conflicts and tensions were resolved and 'regulated' by various social norms, rules and

regulations. Regulationists argue that capitalist economies are marked by distinctive stages in which there will be periods of relative stability when a particular mode of regulation can solve these problems but at other times there will be periods of instability as a new mode of regulation is sought (Pinch, 1997). This geographical theoretical framework illustrates how spatial and social responses to education and welfare reforms were eventually resolved.

Policy developments within education services in the UK, USA and NZ are similar with all adopting neoliberal education reforms. The Keynesian demand management system was replaced by a range of new academic, social and philosophical perspectives whose central common assumptions are constituted by a particular strain of liberal thought (Olssen, 2002). The central defining characteristics of neoliberalism were a revival of classical liberalism particularly classical economic liberalism (Olssen, 2002). A comparison of current Education Acts between the United Kingdom, the United States of America and New Zealand, is shown in Table 2.

The changing geography of the Welfare State and the development of neoliberal education policies in the United Kingdom, the USA and New Zealand (Table 2) reshaped the public's understanding of the purposes of schools. Martinez and Garcia (2000, cited in Ross and Gibson, 2007 p.3) describe the main points of neoliberalism as:

1. The rule of the market.
2. Cutting public expenditure.
3. Deregulation.
4. Privatization.
5. Elimination of the concept of "the public good" or "community" and replacing it with "individual responsibility".

Each of these five points has influenced education services described in Table 2. The first point above, 'the rule of the market', liberated free and private enterprise from any restrictions imposed by the state, and created a competitive culture between state schools. The publishing of

standardised testing results and league tables, identifies schools with failing students and increase parental power in school choice. Public expenditure for social services such as education and health, previously subsidised under the 'cradle to the grave' welfare state, were reduced as individual schools became administrators of their own budget and operating fund based on their student roll. Deregulation enabled popular schools in some regions to draw up their own enrolment zones to maintain a middle class advantage by keeping out poorer households. Privatization involved the selling of state-owned assets, goods and services to private investors. In some welfare states, neoliberal reforms included the selling of public education services, for example voucher and charter schools (Hill, Pierce and Guthrie, 1997). Although this sale may have increased efficiency, privatization concentrates wealth amongst a few and makes the public pay more for its educational needs (Martinez and Garcia, 2000 cited in Ross and Gibson, 2007 p.3). Through neoliberal education reforms the responsibility of educating school age children has been taken away from the state and onto local authorities or in some states the actual school community to be 'individually responsible' in the daily business of running the school. The 'rule of the market' and 'individual responsibility' are processes within the education sector that advantage the middle class because they have the education and skills to be able to run a school as an efficient business. Inequalities in education have not reduced in welfare states since neoliberal reforms were adopted (Ross and Gibson, 2007).

Table 2: Comparison of Education Services between the UK, the USA, and NZ

Education Services	United Kingdom (England, Wales, Northern Ireland)	United States	New Zealand
Neoliberal education policy	Education Reform Act 1988 (http://www.legislation.gov.uk/ukpga/1988/40/contents)	Improving America's Schools Act of 1994. Elementary & Secondary Education Act 2001 (also known as 'No Child Left Behind Act') (http://www2.ed.gov/policy/elsec/leg/esea02/index.html)	Education Act 1989 (also known as 'Tomorrow's Schools') Education Amendment Act 2000 (http://www.legislation.govt.nz/act/public/1989/0080/68.0/contents.html)
Neoliberal intervention within Education Acts	Schools able to remove themselves from Local Education Authorities, and be funded by central government. National Curriculum introduced. Publishing of examination results of schools (league tables) introduced. (http://www.educationengland.org.uk/documents/pdfs/1988-education-reform-act.pdf)	Assessment-driven reform. Standards-based assessment Assessment-centered accountability High-stakes consequences. (Wang, Beckett and Brown, 2006)	Regional education boards were abolished. Policy decisions were centralised. Responsibility for the administration and management of individual schools was placed with an elected Boards of Trustees. (http://www.nzcer.org.nz/research/impact-education-reforms)
Post Neoliberal school	The Act introduced a market approach to this public service by developing three management types of schooling where funds were provided by local authorities or by central government. Financial control would be handed to the head teacher and governors of a LMS and CTC school. (www.educationengland.org.uk)	The Act requires states to develop assessments in basic skills. States must give these assessments to all students at select grade levels in order to receive federal school funding. (Wang, Beckett and Brown, 2006)	A centralised system framework with high levels of local responsibility. All of NZ's state and state-integrated schools have a Board of Trustees that are responsible for overseeing the management of personnel, curriculum, property, finance, policies and administration. (www.minedu.govt.nz)
School Assessments	National Curriculum Assessments (Sats) introduced for 7 year olds in 1991 and 11 year olds in 1995 (Sats for 14 year old were introduced in 1998 but discontinued in 2009). General Certificate of Education (GCE) comprises of two levels: Ordinary (O) and Advanced (A), introduced in 1951 replacing School Certificate and Higher School Certificate (www.educationengland.org.uk)	The Act does not assert a national achievement standard; standards are set by each individual state. The National Assessment Governing Board, appointed by the US Secretary of Education but independent of the Department, sets policy and is responsible for developing the framework and test specifications. (Wang, Beckett and Brown, 2006)	National Standards introduced in 2010 for Years 1-8. National Certificate of Educational Achievement (NCEA) levels 1, 2 and 3 were introduced in 2002 for Years 11-13, replacing School Certificate, Sixth Form Certificate, and Seventh Form Bursary. (www.minedu.govt.nz)

2.4.3 Impacts of neoliberal education reforms on educational inequalities

When we consider the main points of neoliberalism and review the education services of the post-neoliberal school (Table 2) in the UK, USA and NZ, processes that would influence educational inequalities arise. Firstly, the state has reduced their involvement and funding in education through increasing parental involvement, parental power and parental responsibility in the operational management of schools. Secondly, the state has increased parental choice in schools through introducing a new curriculum, standardised testing, enrolment zones, socio-economic ratings, and publishing of school results. Finally, the state has encouraged the development of a competitive culture between schools within the state education system. Combined, these three 'market' approaches to educating school age children placed the responsibility away from the state and onto the local school community to be 'individually responsible' in the daily business of running the school. Inequalities in education have occurred because of the difference between social classes when it comes to the organisation and skills required to run a school. The education reform policies are now discussed under these three processes: increased parental involvement in schools, increased parental choice in schools, and the development of a competitive culture between state schools in education.

Process 1: Increased parental involvement in schools

Increased parental involvement in post-neoliberal schools is defined through increased parental power and parental responsibility in the management of schools, not to be confused with schools having increased verbal or written contact with the parents of school students. Parental involvement in schools has increased through the transfer of school management away from the State (or local authorities, education departments and boards) and onto parent-elected trustees or governors. In some States, elected parent representatives are now involved in the operational

responsibility of post-neoliberal schools, regardless of the socio-economic status of the student composition.

The Education Reform Act 1988 in England, Wales and Northern Ireland, increased parental involvement in schools through developing three management types of schooling, two of which transferred financial control away from Local Authorities and on to the head teacher and governors of a school (www.educationengland.org.uk). In New Zealand, the 1989 Education Act transferred the operational responsibility for 2,259 primary schools away from regional education boards to local boards of each school with parent-elected trustees (Butterworth and Butterworth, 1998). Secondary schools were already run locally, by boards of governors that had hiring and firing powers, but now also they were to be run by parent-elected trustees (Butterworth and Butterworth, 1998).

The Education Act 1989 in New Zealand empowered parent representatives on school boards to make choices, and because all boards and principals are not equal, some choices will not be as advantageous as others (Butterworth and Butterworth, 1998). Each Board of Trustees is responsible for overseeing the management of personnel (including the recruitment of new principals), curriculum, property, finance, policies and administration of their school (www.minedu.govt.nz). Research into low-SES schools and governance in New Zealand found differences in governance related to school decile (were low decile ratings represented the most disadvantaged socio-economic group). Forty one per cent of high-decile school principals said their board had all the expertise needed while only 4 per cent of low-decile school principals said so (Wylie, 2007). Of the low-decile schools, thirty-one per cent of principals thought their board was coping or struggling compared with ten per cent of mid-decile school principals and six per cent of high-SES school

principals (Wylie, 2007). Board experience and skill were also rated much lower by low-SES school principals and this could lead to governance failure (Wylie, 2007).

In the USA, education reforms re-structured schools to advocate site-based management, in which school districts return control to school sites (Hiatt, 1994). Each school is to have a governing board whose membership must include a majority of school parents. The governing board would determine curriculum, create budgets, hire faculty, and organize the school facilities, students, and faculty. Funds to support the development of school restructuring have been provided by the state. (Hiatt, 1994)

Communities of low socio-economic status, which are often grouped along ethnic lines in the UK, USA and NZ, have found it more difficult to find parents among them who already have the education, financial and business expertise, confidence and interest that effective Board members require (Butterworth and Butterworth, 1998; Spreng, 2005). Parents who are elected onto the governing board at their children's school may have social and cultural capital within their school community but may have less skill in financial management, recruitment and interviewing new principals, thus causing their school to fall behind (Butterworth and Butterworth, 1998; Brooking, 2005; Wylie, 2007). Advantages in moving to site-based management have been in the areas of increased voluntary support, the opportunities for school professionals and members of their school community to learn from each other, and for school professionals to become more articulate about what they do, and why (Wylie, 2007). In a 1996 national survey of primary and secondary board chairs in NZ, where just under half participated, the benefits of the Education Act 1989 were seen mainly as allowing the school to meet community needs better, supporting community involvement, and the school being able to set its own priorities within its budget, and able to make its own decisions (Wylie, 1997). But education is not a commodity like petroleum, whose composition and

quality can be standardized, therefore the disparity in Board of Trustees between schools has resulted, which in turn influences further educational inequalities as a Board of Trustee's capacity can be limited for schools that serve low SES students (Butterworth and Butterworth, 1998; Spreng, 2005)

Research into how school governance can contribute towards student performance found little or no sound evidence of a "direct causal relationship between school self-governance and improved educational outcomes" (Rentoul and Rosanowski, 2000, cited in Wylie, 2007, p.5). Schools have been instructed through government neoliberal policies to increase parental involvement in schools which has enabled parents to feel they are contributing or have responsibility in the school. But research into their contribution has found they are unable to improve student educational outcomes, and their work in the school community is regularly critiqued and reviewed by the State.

Process 2: Increased parental choice in schools

The State has increased parental choice in schools through introducing a new curriculum, standardised testing, enrolment zones, socio-economic ratings, and publishing of school results and league tables. Prior to the education reforms, students attended the school to which they were assigned, learned from teachers who used and adapted the school's curriculum, and were evaluated based on teacher-prepared assignments (Hursh, 2007). Now, parents often choose which school their child will attend, and students learn from teachers who teach what is needed so the students will do well in the state's standardised tests and national examinations. These changes reflect policymakers' greater faith in markets and competition, than in teachers and their students. (Hursh, 2007)

The 1989 Act in NZ made schools 'marketable' with parents as 'consumers' who could choose to send their children elsewhere if dissatisfied. Following the 1989 Act, a new central Education

Review Office (ERO) was established to replace the system of inspectors from the Department of Education. ERO reviews and reports on the operations and performance of every school in the country in a three yearly cycle, and teams return sooner if they identify shortcomings. ERO reports are available from their website (www.ero.govt.nz) where parents are able to read the latest educational review on any school in New Zealand, along with socio-economic data of a school's student composition. This availability provides increased parental choice in schools as parents are able to make informed choices on the preferred school for their child. ERO addresses failing schools by improving or closing the school. The most involved parents have the knowledge and facilities to access ERO reports to advantage their parental choice options.

When a school is failing, almost always a low SES school, the State will attempt to construct this school failure as the responsibility of the school in order to gain ideological power as agents of accountability (Thrupp, 1998). But it is argued that this failure is due to broader social and political constraints placed on schools by Education reforms (Thrupp, 1998). By applying the 'Institution Model' to a failing school, school closure will not resolve the impacts of high-poverty in the students that attend this school (Borman and Dowling, 2010). Educational inequalities may decrease when a failing school closes and students need to locate to another school with better resources, but school closure may also disrupt the fabric of the surrounding community and there will be increased costs to the low-SES family with transferring their child to a new school.

In New Zealand, popular schools located in middle class neighbourhoods with enrolment schemes drawn up by the Board of Trustees may exclude streets that contain households that are not middle class. This is because middle-class students have fewer needs arising from poverty and disabilities (Hursh, 2007). School enrolment zones have compounded existing inequalities between rich and poor communities and excluded the middle classes from observing and understanding the problems

and lifestyles of the lower socio-economic groups. Zoning has advantaged the middle class already residing within segregated residential areas, and effectively removed contact between social classes.

The introduction of standardised testing enables the government or the state to compare the overall achievement between students of the same year group and overall between schools of the same decile rating. Schools that contain failing students are targeted for intervention. Results are published so parental power in school choice is available, which is another facet of today's schools (Lipman, 2007).

Publication of school examination results promote schools that contain students that are achieving towards the standard. Therefore, successful schools became popular schools filled with students that are achieving. The publication of school test results reveals the types of students attending the school rather than the quality of the school. The ranking of schools to rigid guidelines fail to take into account the wider social conditions of schools that are ranked the lowest. The most involved parents will avoid failing schools, leaving only the children of non-ambitious parents to attend. Schools with low SES students or low ranking on league tables may not indicate the quality of the teachers, the school or the availability of school resources.

Process 3: Competitive culture between state schools

Neoliberal education reforms enabled schools to adapt a business model 'market' approach for their school. In New Zealand, reforms and government policy has advantaged high socio-economic schools that have been able to maintain a middle class advantage through drawing up their own enrolment zones, meeting any operational deficits through increasing parent donations, and raising additional resources through social and cultural capital (Harrison, 2004). Competition between schools has increased since the reforms, with 31% of New Zealand Principals in 1999 feeling their

school was competing with others, up from 21% in 1996 (www.nzcer.org.nz). The post-neoliberal school competes for funding through maintaining their student roll, and if student numbers decrease, this results in reduced resources and curriculum choice for the remaining students (PPTA, 2011)

Butterworth and Butterworth (1998, p.246) state “it is often claimed that schools in more affluent areas are getting richer and those in less affluent areas are getting poorer as a result of the reforms. The overall evidence suggests that, if this is happening it is not because of any bias in government policy”. But it can be argued that this view from Butterworth and Butterworth (1998) is too narrow. Government neoliberal policies have widened the gap between rich and poor and increased income inequality within developed countries and “created massive social and economic inequalities among individuals and nations” (Ross and Gibson, 2007, p.2). Educational inequalities have widened because of the polarisation of the market: high SES families are likely to bypass their local working class school intensifying the division between schools along SES and ethnic lines (Hughes, et al., 1996).

In New Zealand, state neighbourhood schools have a functional community where people regularly interact and the students often walk to school. State-Integrated schools in New Zealand, for example Catholic Schools, have a value community where people share common values. There is competition between these two types of schools even when they have the same decile rating and same student outcomes. Catholic schools and their value community have improved the educational performance of some students that come from low SES families or those that lack structure and stability from their home and community. (Harrison, 2004; Coleman and Hoffer, 1987)

The Smithfield Project (Hughes, et al., 1996) researched the impacts of marketisation of education on the educational equality of opportunity following the introduction of neoliberal policies and the

Education Act (1989) in New Zealand. Hughes, et al., (1996) found in general terms a trend towards segregation in schools as the result of the market structures observed. The professional middle class were exercising choice. Working class schools appeared to have increasingly unstable school populations. Schools in decline, were more likely a function of choice than demographic. The most advantaged schools were ensuring the privilege of the already privileged. (Lauder, et.al., 1994)

As a result of neoliberal reforms, schools have been influenced by the economics of the 'market approach' strategy and found ways to 'select' students for financial and academic advantage within the state school system. School enrolment zoning may not be drawn on geographical boundaries but may gerrymander to exclude streets of low SES households. Out of school enrolment zone ballots and academic or sporting scholarships may be administered under selective processes. Schools have become competitive through advertising 'open nights' or 'open days' where parents can view the school before their child is age appropriate for enrolment into that school. Glossy brochures and mission statements have assisted in maintaining a popular secondary school away from its competition. (Pearce and Gordon, 2005)

Standardised testing of students and schools has introduced market competition between schools (Hursh, 2007). In the USA, some states such as New York and Texas, require students to pass one or more standardized exams in order to graduate from high school. While in Florida, schools with high test scores (most often those with white middle to upper class students) receive a financial reward and those with low test scores lose funding and their students are provided with vouchers to help pay private school tuition (Hursh, 2007). At the federal level, the USA Education Act uses student scores on standardized exams to determine whether schools are succeeding or failing to make adequate yearly progress. Schools that fail to make adequate yearly progress face losing students to

competing schools, or turning over school operations to the state or to a private company with a demonstrated record of effectiveness (Hursh, 2007).

In England, students applying to university have in the past experienced the pressure of high-stakes standardized tests, but the tests are now high stakes for every student, teacher and school. The market orientated policies have introduced competition between schools and between students both within and across schools. English schools, which have open enrolment, receive funding based on the number of students in the school. Consequently, schools compete for white middle-class students because these students have fewer needs arising from poverty and are more likely to raise the schools aggregated test scores published in the annual school league tables (Hursh, 2007).

Schools with high test scores are likely to admit high-scoring students to their few openings, where those schools with low scores are desperate to retain their able middle class students (Gillborn and Youdell, 2000 cited in Hursh, 2007 p.17). Schools serving diverse students and needs, struggle to retain their students and funding once league tables are published.

Competition between schools has increased due to parental involvement and parental choice. Online publication of school league tables, examination results, and the ethnic composition of the school provide involved parents with an insight to how a school is operating. Involved parents willing to advantage their children can enroll them in a high decile state school containing students that are achieving. Therefore, the business of running an efficient popular school is economical within a political framework of neoliberal reforms.

2.5 Conclusion

Education is a process of teaching and learning within a complex system of interdependent parts referred to in this thesis as educational inputs and educational outputs. This chapter aimed to provide the reader with an understanding of the traditional and current explanations of educational inequalities in the United Kingdom, the United States of America and New Zealand through various processes within three educational inputs: the student, the school, and the state (refer to Figure 1). Education inequalities are defined as the disparity that some students experience in their education when compared to other students. Educational inequalities appear measureable when schools' resources are compared and found to differ, and when unequal educational achievement occurs between students of the same ability.

Traditional explanations of educational inequalities found educational performance and achievement were quantitatively assessed in terms of a student's ability to read, comprehend and write English in a national examination. Research during the 1960s and 1970s into educational inequalities focussed on student's social class and family background, gender and ethnicity. While later research, with a geographical perspective, has looked at the contextual factors influencing the education performance of students.

Within the educational input of the school, there are four processes that influence educational inequalities: unequal distribution of school resources (financial and classroom based), student composition, social and cultural capital, and the 'school effects' of the place. By studying the school as a place, one can analyse the school's distinct social environment that influences education inequalities through the 'school effects' of the broader societal context.

The education input of the state with regards to educational inequalities was researched focussing on the early provision of both primary and secondary education, the state's intervention into education during following the Second World War with the introduction of the economic doctrines of John Keynes, and the neoliberal education reforms of the 1980s. Early provision of education services were found to be selective and class based, which then developed racial and residential segregation. Secondary education was not available for all SES groups. Educational inequalities occurred between students of the same ability, but of different SES groups, as lower SES groups contained students that were leaving school earlier.

The neoliberal educational reforms of the 1980s reshaped the public's understanding of the purposes of schools. The responsibility of educating school age children was transferred from the state and onto local education authorities or in some states the actual school community to be individually responsible in the daily business of running the school. The 'rule of the market' and 'individual responsibility' are processes within the education sector that advantage the middle class because they have the education and skills to be able to run the school as an efficient business. Neoliberal reforms have increased parental involvement in schools, increased parental choice in schools, and have enabled a competitive culture between schools. Educational inequalities have not reduced since the reforms were established because of the 'rule of the market' has polarised the market: high SES families are likely to bypass their local working class school intensifying the division between schools along SES and ethnic lines (Hughes, et al., 1996). Schools in decline lose their function within the community.

Education as a public good is seen in a number of ways including the potential to develop the moral, ethical, social, cultural, and political awareness of all students, as well as to assist in the effective operation of the democratic process (Olssen, 2002). Education is an investment. Schools are

relatively powerless to close the educational gap which requires a change of emphasis away from the school and onto government policies, to remove the causes of poverty within the student composition of the school. Educational inequality is one part of a wider social inequality.

Income inequality, child poverty, the role of health, and a change in environmental factors also influence educational inequalities but they are not discussed directly within this chapter.

Educational inequalities are also a social problem but within government and state legislation, funding is either allocated directly to 'health' or 'education' or 'income support'. Schools that require 'health and wellbeing' intervention for a student may use volunteers outside of their parent community for assistance. Volunteers may also provide a school with value based 'social or cultural capital' to assist the school's governance role.

The objective of this chapter was to provide the reader with a geographical perspective into the range of influences pertaining to educational inequalities. Fixing the social class factors may not influence the contextual factors that lead to educational inequalities or low student performance. State policies are not able to be ignored by schools requiring funding to balance their budgets. But the role of the family remains fundamental in a student's educational achievement.

Chapter 3: Urban Natural Disasters and their Educational Impacts

3.1 Introduction

An urban natural disaster impacts on people and communities, students' education and their educational performance, and the physical environment undergoes changes. The city's physical exposure may cause extreme vulnerability because natural events often have an uneven geographical impact. Communities living coastally or near an earthquake epicentre may experience a much stronger natural event than those living in other 'safer' parts of the same city. Even in modern societies, the impacts of an urban natural disaster on people and places may have been enhanced due to poor urban planning and inadequate housing.

A natural event within a modern society, that causes death and destruction, is world-wide news. Public interest in the event takes hold and media watchers are informed, now in 'real time'. After the event, investigation and research is completed by academic, government and non-government organisations (NGOs) searching to find out the 'why', 'how', 'impacts' and 'what we learnt' from this natural event. Often domestic and international tourism to the area is affected causing an immediate economic impact.

This chapter aims to discuss existing research on the impacts of urban natural disasters on people and places in a modern developed society in general terms and more specifically to research the impacts on education and education inequalities. Natural events within a modern urban environment will be defined along with examples and case studies. A geographical perspective on environmental justice will be discussed along with unanswered questions and areas requiring further research.

3.2 Impacts of urban natural disasters on people and places

Humans have and will continue to settle in environmentally dangerous places (Pais and Elliott, 2008). Urban natural disasters damage local infrastructure and strain the ability of local systems to meet the population's basic needs (Norris, 2002). For survivors, disasters may cause a range of stressors, including threat to one's life, exposure to the dead and dying, bereavement, profound loss, social and community disruption, and on-going financial hardship (Norris, 2002).

Definition

An 'urban natural disaster' is defined within this thesis as 'an event that involves deaths and the destruction of property and infrastructure within an urban environment caused by a natural force, for example, floods, hurricanes/tropical cyclones, and earthquakes'. This chapter does not include droughts, war, failure of technology or mass violence as causes of an urban natural disaster. A natural event that does not result in deaths is not considered, as within the context of this thesis, it is not an urban natural disaster.

The Red Cross defines a disaster as "an event that involves 10 or more deaths, affects 100 or more people, or leads to an appeal to them for assistance" (Norris, 2002, p.308). Within the USA, Japan, Australia and New Zealand, the characteristics of a natural event that caused an urban natural disaster within the definition provided by Red Cross are listed in Table 3. Each of the natural disasters listed caused death and destruction. Survivors of these natural disasters may always remember them, as will those media viewers around the world that watched the impacts of the disaster unfold.

Table 3: Characteristics of an Urban Natural Disaster - Actual events.

	Darwin (Australia)	Northridge (LA, USA)	Kobe (Japan)	New Orleans (USA)	Canterbury (NZ)	Tohoku (Japan)
Natural Urban Disaster Local dates and time	Tropical Cyclone Tracy 24-25 December 1974	Earthquake 17 January 1994 at 4.31am	Earthquake 17 January 1995 at 5.46am	Hurricane Katrina 25-29 August 2005	Earthquakes 4 September 2010 at 4.35am, 22 February 2011 at 12.51pm, 13 June 2011 at 2.20pm	Earthquake and Tsunami 11 March 2011 at 2.46pm
Physical and Environmental Impacts	Strong rain. Storm surges. Winds destroyed 70% of buildings including 80% of houses	Land and building damage and highway collapse	100,000 buildings destroyed (many unreinforced masonry buildings), collapse of highway	Levee system in New Orleans failed causing 80% of the city to flood.	Landslides, rockfalls, liquefaction, land tilting, building collapse. Waste water and sewerage systems severely damaged	Land, building and infrastructure damage. Dam collapse from earthquake. Flooding. Further destruction from Tsunami waves.
Economic Impacts	\$800 million (1974 USD) Australian's largest natural disaster at that time	Very small share of national output	Affected prefectures account for 4% of national GDP	Costliest natural disaster at that time. Estimated at 108 billion USD	Damaged concentrated in Christchurch city which accounts for around 8% of GDP	Affected prefectures account for 4-6% of GDP
Social Impacts	71 deaths 41,000 homeless 30,000 evacuated after 26 December. City now rebuilt	58 deaths About 30,000 affected with 1,500 admitted to hospitals	6,435 deaths 27,000 injured. 300,000 left homeless	1,836 deaths in total including 1,577 from Louisiana. Over 1 million self-evacuated if able to, many remained.	185 deaths About 2,000 injured, 164 serious 460,000 affected. 150,000 homes damaged. Respiratory illnesses.	15,881 deaths 2668 missing 400,000 directly affected. Radiation releases from damaged nuclear facilities
Red Cross involvement	Assisted in the evacuation of refugees	400,000 people registered for various types of federal disaster assistance	High civic engagement from all over Japan.	American Red Cross and many other NGO relief agencies responded	New Zealand Red Cross, Government and NGO relief agencies	Japanese Red Cross has extraordinary disaster and response capabilities

All online resources listed below accessed on 14 March 2013

Cyclone Tracy: www.ntlapp.nt.gov.au, www.disasters.ema.gov.au /Northridge: Kamel, et. al., 2003, www.rbnz.govt.nz, <http://pubs.usgs.gov/of/1996/ofr-96-0263/introduc.htm#impacts> /Kobe: Abbott, 2006., www.rbnz.govt.nz / Hurricane Katrina: www.hurricanekatrinarelieff.com, Blake and Gibney, 2011 /Canterbury Earthquakes: www.rbnz.govt.nz /Tohoku Earthquake and Tsunami: http://www.npa.go.jp/archive/keibi/biki/higaijokyo_e.pdf , www.rbnz.govt.nz

An urban natural disaster is more than an individual level event. It is also a community level event with consequences even for those persons who experience no direct losses (Norris, 2002). Bolin (1985) observed that there are two broad categories of victims in a disaster; primary victims who directly experience losses, and secondary victims who live in the affected area, but sustain no personal injuries or damages. From this conceptualisation, it can be inferred that survivors of urban natural disasters, like those listed in Table 3, can be categorised and the impacts assessed and analysed at the individual level.

3.2.1 Types of impacts

Research into major natural urban disasters listed in Table 3, indicates that a variety of physical and environmental, economic, and social impacts take place. If sustainable urban planning and active risk management of the urban location had occurred, then the impacts maybe reduced although the economy will still be disrupted. Policy makers, academics and NGO relief agencies have studied previous events and their findings provide information towards making disaster relief more scientific and effective.

Every type of urban natural disaster results in different types of damage. A tropical cyclone, hurricane, and tsunami, for example, may result in coastal flooding, building and infrastructure damage. The damage from an earthquake is likely to be stronger near the epicentre and may result in building collapse and damaged infrastructure. Deaths define the natural event as an urban natural disaster.

Physical and Environmental Impacts

The range of physical and environmental impacts from natural urban disasters is listed in Table 3.

The wind speed from Cyclone Tracy and Hurricane Katrina caused storm surges, flooding and

damage to buildings and infrastructure. The ground acceleration from the shallow Canterbury earthquakes moved the land horizontally and vertically resulting in landslides, rockfalls, liquefaction, building damage and building collapse. The liquefaction and shaking from the Northridge and Kobe earthquakes caused highways to collapse and major infrastructure damage. The offshore Tohoku earthquake triggered a tsunami that then caused further destruction once it reached land.



Figure 4: Flood waters inundate housing in New Orleans. [image online]
Available at <<http://www.broadwaycares.org/Page.aspx?pid=800>> [Accessed 15 May 2012].

Unlike Tropical Cyclone Tracy, in Darwin, Hurricane Katrina did not directly hit the city of New Orleans (Shaughnessy, White and Brendler, 2010). Research found extensive flooding was due to the physical nature of this urban environment. Originally, the City of New Orleans was built along the high sandy ground beside the Mississippi River. Construction of the flood protection levees or stop-banks along the Mississippi developed trade networks along the river and New Orleans soon became a major port. By 1840, New Orleans had become the wealthiest and third-most populous

city in the USA (www.bycitylight.com). Low-lying areas, several feet below sea level, were drained and more levees were built allowing the city to spread into areas previously unsuitable for housing. Research found the energy of Hurricane Katrina released rain and wind inundating New Orleans with such power that levees failed causing flood waters to reach the low-lying areas drowning them in up to 15 feet of water (Figures 4 and 5).

The western states of the USA, Japan, and New Zealand all lie within the tectonic region of the active Pacific Plate. In Japan, the Kobe Earthquake in 1995 and the Tohoku Earthquake in 2011 both resulted in deaths and destruction while the later caused a major tsunami and exposed residents to radiation released from a damaged nuclear plant (refer to Table 3). Research by State and NGO agencies, along with academics, have provided the public and policy makers with an understanding of 'how' these earthquakes occurred, 'why' the earthquakes resulted in damage and deaths, and provided scientific data to other modern societies to mitigate the effects of earthquakes in urban communities. Collaboration between Urban Search and Rescue organisations in the USA, Japan and New Zealand has sped up the rescue process and reducing the death toll.

Economic Impacts

The six natural urban disasters listed in Table 3 all impacted the economy of each country. Local industries were disrupted resulting in loss of employment. The overall GDP of each country was affected along with domestic and international tourism to the area. The Northridge earthquake in 1994 and the Christchurch Earthquake in February 2011 are rated as the two highest earthquake loss events for the global insurance industry (www.theaustralian.com.au). JP Morgan estimated in February 2011 that the 22 February 2011 Christchurch earthquake could cost insurers up to \$US12bn (\$NZ16bn) and that could make it the second-highest earthquake loss for the global insurance industry after the \$US20.3bn bill for the 1994 earthquake in Northridge, California

(www.theaustralian.com.au). The latest estimated cost of rebuilding Christchurch is NZ\$40 billion (as at 28 April 2013). Both natural events occurred in residential areas. The earthquakes damaged the local infrastructure and placed a strain on local systems designed to meet the population's basic needs. Residents of both Northridge and Christchurch experienced more than 10,000 aftershocks in the following year after the first natural event. (www.rbnz.govt.nz)

Kobe Earthquake in 1995 struck exactly one year after Northridge. Although the earthquakes were of similar magnitude, the Kobe earthquake resulted in higher deaths (refer to Table 3) due to the collapse of unreinforced masonry structures. Due to the lack of insurance cover in Kobe, the cost of this disaster cannot be calculated, but it is estimated that 100,000 buildings were destroyed. Both earthquakes resulted in spectacular highway structure collapses. (<http://pubs.usgs.gov>)

Social Impacts

For survivors, the social impacts of a natural urban disasters like those listed in Table 3 include exposure to the dead and dying, profound loss, homelessness, displacement, on-going financial hardship, and short term or long term injuries. Social impacts also include ill-health. Radiation was released from damaged nuclear facilities following the Tohoku earthquake and tsunami (Table 3). Respiratory illnesses have occurred to residents in Christchurch from breathing dry liquefaction ejecta (silt), which was present after the Canterbury earthquakes and has settled on residential land and under the floor boards of older homes.

In Darwin, within 48 hours of Cyclone Tracy, the RAAF Hercules were flying out injured and sick to hospitals in Brisbane and Sydney. The exodus soon developed into a massive airlift where the population of Darwin was reduced from 45,000 to 10,500 people. The outstanding feature of this evacuation was the great distances involved in transporting nearly 24,000 people to the various Australian capital cities, the nearest of which was Adelaide, some 3,000 kilometres to the south. It is

estimated that about 10,000 survivors travelled out by road taking their pets with them. (Milne, 1977)



Figure 5: Flood waters reached heights of 15 feet in low lying areas in New Orleans. [image online]
Available at: <http://news.bbc.co.uk/2/shared/spl/hi/pop_ups/05/americas_the_story_of_hurricane_katrina/html/3.stm>
[Accessed 15 May 2012]

Research by Milne (1977) into survivors of Tracy have been categorised into three groups; Darwin Stayers, Returned Evacuees, and Non-Returned Evacuees. A sample from each of group were interviewed by Milne (1977) between July and October 1975. The aim of this research was to compare the personal and social adaptation of the groups in the aftermath of the disaster, and the extent to which each was affected adversely. Results indicate that the worst effects from the cyclone were experienced by those who were evacuated and had not returned to Darwin. By comparison, the 'Darwin Stayers' were seen to have suffered least from the disaster. When questioned, 25% of all evacuees studied regretted the decision to leave Darwin (Milne, 1977).

In July 1975, seven months after Cyclone Tracy, the population of Darwin was estimated at about 33,000, a large proportion of them newcomers involved in the re-build. In 1977, it was estimated that half of the evacuees had returned to the city, which had now approached its pre-cyclone population (Milne, 1977). In 2011 the population has continued to grow and is estimated at 78,624 (<http://profile.id.com.au/darwin>). Unlike Tropical Cyclone Tracy, Hurricane Katrina exposed the existing poverty of the region. The population of New Orleans stood at 1,190,615 prior to Hurricane Katrina but 194,800 of the population lived at or below the poverty line at the time of the storm (Shaughnessy, White and Brendler, 2010). New Orleans was effectively a 'welfare city' before Katrina arrived (Boettke, et al., 2007, cited in Shaughnessy, White and Brendler, 2010, p.94). The ability of a household to evacuate, return home, rebuild if necessary, and find employment again varied depending on the household wealth or income (Shaughnessy, White and Brendler, 2010). The extent to which households of different social classes, ethnic groups and income levels were affected by Katrina will continue to be researched (Akers, 2012). But the ability of people living below the sea level and below the poverty line to survive an urban natural disaster like Katrina is dependent on the disaster preparedness procedures in place by the State, which may be less likely to occur in regions where poverty and income inequality exists (Kahn, 2005).

3.2.2 Technology and research into reducing the impacts

Within modern societies, the role of technology is now an important tool in mitigating the impacts of destructive natural events. When Tropical Cyclone Tracy devastated the coastal city of Darwin in 1974 it was Australia's largest natural disaster at that time (Table 3). Residents were warned of the cyclone approaching but no one was evacuated as it was not predicted to directly hit the city. The damage was catastrophic and forty one thousand residents were made homeless (Figure 6). Thirty one years later when Hurricane Katrina approached the southern states of the USA, satellite

technology provided a predicted path of the hurricane enabling the State and NGO relief agencies to inform residents of evacuation procedures (Figure 7). Over one million people self-evacuated if able to, but many remained. Hurricane Katrina resulted in deaths and destruction but satellite technology and subsequent media communications informed and prepared the urban coastal communities for the impacts from this natural event.



Figure 6: Darwin after Cyclone Tracy hit December 1974
Stevens, R., n.d. [image online]. Available from <<http://www.theage.com.au/afl/afl-news/a-tense-time-waiting-for-the-storm-to-strike-20100714-10b34.html>> [Accessed on 14 March 2012]

In Australia, Cyclone Tracy sparked a reassessment of both government and individual attitudes towards tropical cyclones and spawned an accelerated interdisciplinary research interest into natural hazards (Weyman and Anderson-Berry, 2002). This research provided information towards making disaster relief more effective in coastal urban communities within Australia. Further research completed in 2008, looked at what would happen if Cyclone Tracy hit Darwin today.

Results showed improved building standards vastly reduced the number of buildings that would suffer complete destruction like those pictured in Figure 6 (www.ga.gov.au).

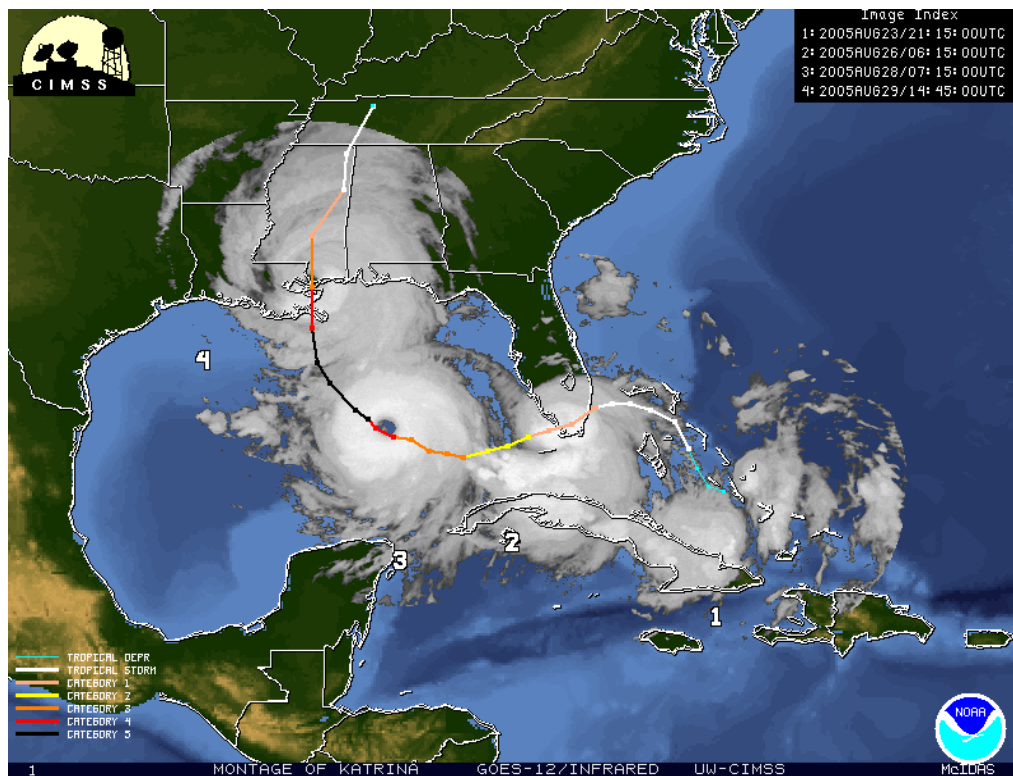


Figure 7: Hurricane Katrina. Montage of NOAA Satellite images prepared by CIMSS (Cooperative Institute for Meteorological Satellite Studies). [image online].
Available from <<http://www.climate.noaa.gov/index.jsp?pg=../education/hurricanes/multimedia.jsp>>
[Accessed on 15 May 2012]

3.3 Urban natural disasters and environmental justice

The impacts of natural disasters are often greater on low SES groups due to the fact that they are more likely to live in communities with a greater concentration of environmental hazards. Poorer communities are often sites for landfills, toxic waste sites, energy production and transportation

infrastructure. There is some debate over whether the installation of a potentially hazardous sites are disproportionally located in low SES communities or whether the planning or installation of a potentially hazardous site caused higher SES groups to move away, land values to drop and lower SES households moved in (Pastor, Sadd and Hipp, 2001).

The role of sustainable urban planning is often not taken into practice for a variety of financial, political and social reasons (Gencer, 2013). A geographical perspective on environmental justice seeks to articulate environmental issues from a 'Social Justice' perspective (Johnston, et al., 2000). Social justice is a broad concept where attention is focussed on the distribution of society's benefits and concerns with regards to the circumstances under which spatial inequality can be justified in some moral sense (Johnston, et al., 2000). A geographical perspective seeks to justify what is *unequal*, and where and why *inequality* exists within society.

Environmental justice research has traditionally focused on the exposure of residents to man-made environmental hazards, for example, air pollution etc., (Mitchell and Dorling, 2003; Jerrett and Finkelstein, 2005; Kingham and Pearce, 2008) but not to natural hazards. However, it could be argued that many low income residential areas have been allowed to develop on or near naturally hazardous sites. This can result in greater damage when a major natural event occurs.

In the United States, low-income groups, members of the working class, and people of colour are more likely to find themselves neighbours of commercial waste facilities (Camacho, 1998). This has occurred because of discriminatory siting decisions and because these groups are persistently underrepresented in the policymaking process (Pastor, Sadd and Hipp, 2001).

Individuals and groups have long promoted the protection of the natural environment (since the 1830s), but this has not stopped the management of, and residential development on, natural

wetlands, for example. From the 1950s, human welfare ecology influenced the modern environmental justice movement where human safety and human survival was the major concern. Where once large facilities attracted working class employees and low-cost housing to a region, now, low-income groups and people of colour are at risk of the health effects caused by acute and chronic exposures to toxins and other environmental hazards (Camacho, 1998). The health effects on a community living near an environmental hazard will have a direct impact on households with school aged children; as their health will affect their ability to learn. Educational inequalities may occur when the education performance of the community school lowers due to the ill-health of the student composition.

Children's geographies is a branch of human geography which deals with the study of places and spaces in children's lives (Johnston, et al., 2000). Research by Freeman and Tranter (2011) into Children's geographies and the benefit of 'child-friendly cities', illustrates a different way of thinking about urban planning. It places children in modern societies in the centre and demonstrates that neighbourhoods and home spaces that are good for children are good for everyone. Methodologies for children to participate in urban regional planning were researched by Cunningham, Jones and Dillon (2003), where children's story-writing was a useful tool in the public consultation process of this age group.

Hurricane Katrina exposed the disproportionate vulnerability to hazards and disasters faced by poor communities. This disaster integrated research into inequalities and the study of environmental justice in the USA (Bullard and Wright, 2009). The original city plan of New Orleans did not propose housing developments on the low wetland areas. When Hurricane Katrina damaged chemical facilities and hazardous waste sites, the toxic waste travelled flowing onto the lowlands of New Orleans.

Protecting nature protects people. Wetland, forests, barrier islands are all ecosystems that form the first line of defence against natural disasters. They serve as a buffer against storm winds and as a sponge to soak up storm surges. Within them, urban communities are more vulnerable to disaster (Bullock, Haddow and Haddow, 2009). Following Hurricane Katrina and the Canterbury Earthquakes, large coastal residential areas have sustained damage. Urban communities were developed on drained wetlands, catering to the demands of urban sprawl and speeding up the natural draining of these lands which may occur with time.

Studies into urban residential developments on drained wetlands indicate after a natural event occurs the residents are often disproportionately affected (Johnson, 2006). The environmental justice of draining land for residential purposes has been ignored to financially benefit both the State (and local government through property taxes and rates) and property developers. In New Zealand, for example, the Resource Management Act has reduced emphasis on socio-economic effects within land-use development (Jackson and Dixon, 2007). Initially, the new residential development provided new home owners with low land values but many are unprepared for the outcomes of living on drained wetlands when a natural event occurs. The survivors of this urban natural disaster in a modern society will require assistance – their lives disadvantaged in the long term through short term gains by capitalists inspired by the market economy.

Although many researchers have studied the economic, social and physical impacts of an urban natural disaster, few have explicitly examined their impacts on education and educational performance. Natural urban disasters are occurring in modern cities. Humans are living in dangerous places and near tectonic plate boundaries. Good health and wellbeing are required for school aged students to achieve to their potential. Inequalities in the provision of education following an urban natural disaster can also be a cause of environmental injustice. Thus the aim of

the next section is to review what post-disaster research has been written with regards to education inequalities and education performance following the natural events listed in Table 3.

3.4 Impacts of urban natural disasters on educational inequalities

The 'educational Impacts' of urban natural disasters include school closures due to building damage resulting from the natural event, changes in education performance of the affected students, and education inequalities which occurred as a direct result of this natural disaster. Following an urban natural disaster, school buildings have often been used to provide shelter and basic needs to local residents, so the context of a school as a learning environment may have altered to a place of care and therapy to all ages during the crisis.

The roles within families also change. Teenage secondary school children may be deeply concerned for other members of their family following an unexpected natural event like an earthquake or major seismic aftershock. The teenager may step up and become the head of the family in finding other family members on the way home. Young adults are aware of the coping mechanisms of their parents, and parents already under stress require family support. The school aged child's ability to relax, read, and study for examinations may have been affected following their personal experience of surviving an urban natural disaster.

Of the urban natural disasters listed in Table 3, there is a large body of information on the increasing levels of social inequalities following each of these natural events (Bolin, 1985; Norris, 2002; Kamel and Loukaitou-Sideris, 2003; Kahn, 2005; Abbott, 2006; Hardy, 2006; Johnson, 2006; Bullard and Wright, 2009; Shaughnessy, White and Brendler, 2010; Weyman and Anderson-Berry, 2002; Akers, 2012; Gencer 2013;). There are a few articles relating to educational inequalities and performance

(Milne, 1977; Hardy, 2006; Akers, 2012), but no research could be found into the disproportionate effects of a natural event on existing educational inequalities where education performance was compared between schools prior to and following the urban natural disaster. There is literature on post-disaster education systems (Akers, 2012) but nothing could be found that includes performance data only descriptions of education inequality.

Research into the effects of Cyclone Tracy on Darwin children were undertaken by Milne (1977). A sample of 267 parents of 649 children, were asked a series of questions relating to problems of post-cyclone schooling, especially those encountered by children who had to change schools. The main purpose was to establish the extent to which children of evacuated families were disadvantaged. Results show 37.2% of 'Non-Returned Evacuees (n=140)' reported "some problems" or "many problems" compared with 6% and 11.7% of Stayers (n=50) and Returned Evacuees (n=140). Sadly, 5% of children from Non-returned evacuees were 'just not coping' (refer to Figure 8).

Table 6. Incidence of Parents Reporting Problems of Children's Schooling

	Stayers (N = 50)		Returned Evacuees (N = 77)		Non- Returned Evacuees (N = 140)		Total (N = 267)	
	n	%	n	%	n	%	n	%
No problems ^a	47	94.0	68	88.3	88	62.9	203	76.0
Some problems ^a	3	6.0	8	10.4	33	23.6	44	16.5
Many problems ^a	0	0.0	1	1.3	19	13.6	20	7.5
<i>Problem areas:</i>								
Level too high	1	2.0	0	0.0	9	6.4	10	3.7
Different teaching methods	0	0.0	5	6.5	27	19.3	32	12.0
Poor social adjustment	1	2.0	2	2.6	5	3.6	8	3.0
Put back a grade	0	0.0	5	6.5	21	15.0	26	9.7
Just not coping	0	0.0	1	2.0	7	5.0	8	3.0

^a No problems, and Some and Many problems combined, gives χ^2 28.55, $p < 0.01$, 2 df.

Figure 8: Incidence of Parents reporting problems of children's schooling following Cyclone Tracy. Data collected in 1976. Sourced from Milne (1977)

Milne (1977) compared his research results with wartime bombardment research by John (1941), who found that “the younger children experiencing air-raids were much more vulnerable to displays of terror by their elders, which not only sharpened the child’s apprehension of danger but weakened his confidence in the elders as a source of protection” (cited in Milne, 1977, p.61). John’s research (1941) suggests “some of the worst effects on children could have resulted from observing the reactions of over-anxious and hysterical adults” (Milne, 1977, p.55).

Research into school age children during wartime bombardment has a place in current research into earthquakes and their aftershocks for groups that remain and do not evacuate to safer parts of the region. For those that do not evacuate to other regions, the experience of remaining in your damaged home and experiencing aftershocks will be influenced by the adults in the household: adults either cope and show resilience and are calm, or they show levels of anxiety which may influence anxiety in other members of the household. More on the post-disaster health and wellbeing of stayers following the Canterbury Earthquakes is described in Chapter 7.

After Hurricane Katrina, New Orleans’s public education system was dismantled and opened to the neoliberal market-based systems (Akers, 2012). The opening of public education to the market has permitted the private education market to expand with Government funded charter schools and the introduction of education vouchers through selective processes. “Over 50% of the schools operating in New Orleans are now charter schools, run by non-profit organizations and private contractors” (Akers, 2012). Admissions take top achievers and exclude students with learning differences. The remaining public schools serve a disproportionate number of the city’s poorest and special needs students.

Hurricane Katrina was one of the biggest natural disasters to hit the USA (www.nhc.noaa.gov). This natural event swept through four states during August 2005 and “caused the displacement of more

than 370,000 school children” (Hardy, 2006). By December 2005, 48% of the students in Bay St. Louis-Waveland had returned to school (Hardy, 2006). Of those who had returned, 80% were classified as being homeless and an equal proportion of returning staff were living in trailers, RVs, and other temporary housing (Hardy, 2006). This disaster, taking place in one of the poorest regions of the US, re-ignited a debate about poverty and government schools, and the responsibility of the government (Hardy, 2006). This debate is about economics and social class, state government education and intervention, and the achievement gap between middle class and poor students. Schools alone cannot lift children from poverty (Rothstein, 2004).

In the USA before Hurricane Katrina, the poverty rate for children was 17% in 2004 with about 37 million people living in poverty and 4 million children living with unemployed parents (Hardy 2006). In the southern states of Louisiana and Mississippi, the child poverty rate in 2004 was 23% and 24% respectively (Hardy 2006). In New Orleans, the child poverty rate prior to the occurrence of the hurricane was much higher at 38% (Hardy 2006). Before Katrina, large urban communities within New Orleans contained a concentration of poor households with local schools educating children living in poverty. Large income disparities existed in New Orleans resulting in the concentration of low-income households living on land not originally planned for housing (Figure 6) but land that was drained and below sea-level. Hurricane Katrina exposed the existing poverty of the region and its disproportionate effects most certainly would have widened existing educational inequalities.

3.5 Conclusion

An urban natural disaster impacts on people and communities, students' education and their educational performance, and the physical environment undergoes changes. The city's physical exposure may cause extreme vulnerability. Impacts on people and places may have been enhanced due to poor urban planning and inadequate housing. Existing inequalities may have widened due to the disproportionate effects of the natural event.

Living coastally or near a tectonic plate boundary exposes the urban population to the possibility of a natural event that may cause death and destruction. Urban environments are spreading and coastal locations are attractive to property developers and new home owners. In some coastal Pacific locations, earthquakes, hurricanes and floods can be frequent events.

Coastlines are locations for natural wetlands, which due to urbanisation, are often drained for housing developments. In New Orleans, following Hurricane Katrina, the residents most effected were those living in the low lying areas where flooding caused inundation and resulted in loss of homes and schools. This resulted in the dismantling of New Orlean's public education system and opened up the provision of neoliberal market-based education systems. (Newmark and De Rugy, 2006).

Environmental justice of protecting the natural environment has not embraced the protection of wetlands when economically this land can be drained and the asset sold for the development of housing. Often drained wetlands are the locations for low socio-economic status housing. Communities built on drained wetlands are exposed to the effects of natural events.

Following an urban natural disaster, the education performance of affected school-age children may change when compared to previous years, between schools within the same urban community and schools across the country. Parents reporting problems of children's schooling was researched following Cyclone Tracy in 1974 (Milne 1977). The significance of this research was the interviewing of three groups of children: stayers, returned evacuees, and non-returned evacuees. Milne's research (1977) compared Cyclone Tracy to wartime bombardment (John, 1941). Research by Milne (1977) indicated children that were evacuated and did not return to Darwin, experienced problems in their schooling.

In the future, post-disaster research in modern societies could include a focus on the education of school age children affected by urban disasters and educational inequalities. But in the meantime, in New Zealand, the myriad of economic and social changes since the establishment of neoliberal policies in the 1980s, along with recent urban natural disasters, have attributed to widening inequalities (Cheyne, O'Brien and Belgrave, 2008).

Chapter 4: The impacts of the Canterbury earthquakes on the city of Christchurch, New Zealand

4.1 Introduction

This chapter provides a contextual background to the three educational inputs and educational outputs (student performance) that are researched and analysed in Chapters 6 and 7 of this thesis. The first chapter introduced how humans have continued to settle in environmentally dangerous places (Pais and Elliott, 2008). The objective of this chapter is to illustrate how the city of Christchurch is one of these places: coastal, originally built on alluvial soils and sand with recent residential housing on drained wetlands, and within a region of tectonic activity. Even after the first European settlers experienced their first earthquakes, they did not abandon this location; instead they remained, re-built and recovered.

The chapter is structured as follows. Firstly, the physical geography of Canterbury will be introduced briefly before discussing some natural events that have occurred in Christchurch including the 2010 and 2011 earthquakes. Second, the history of residential settlement and the provision of educational services will be examined, with particular attention being paid to patterns of housing development and the environmental risks associated with these for different socio-economic groups in the city. Finally, government interventions into education following the Canterbury earthquakes and aftershocks is detailed, given that, the results of these interventions are analysed in Chapter 6.

4.2 The physical environment of Christchurch, Canterbury

The city of Christchurch is located on the east coast of the South Island of New Zealand (refer to Figure 9). The Alpine Fault and other major fault lines shown in Figure 9 are formed from the tectonic boundary of the Australian and Pacific plates. The Pacific plate is moving in a south-west direction at around 38mm per year resulting in the formation of the Southern Alps. The land beneath Christchurch was formed from alluvial gravels carried eastwards in flood waters from the eroding mountains. The South Island of New Zealand has a remarkable geographical diversity of coastal plains and rugged mountains. (Coates, 2002)

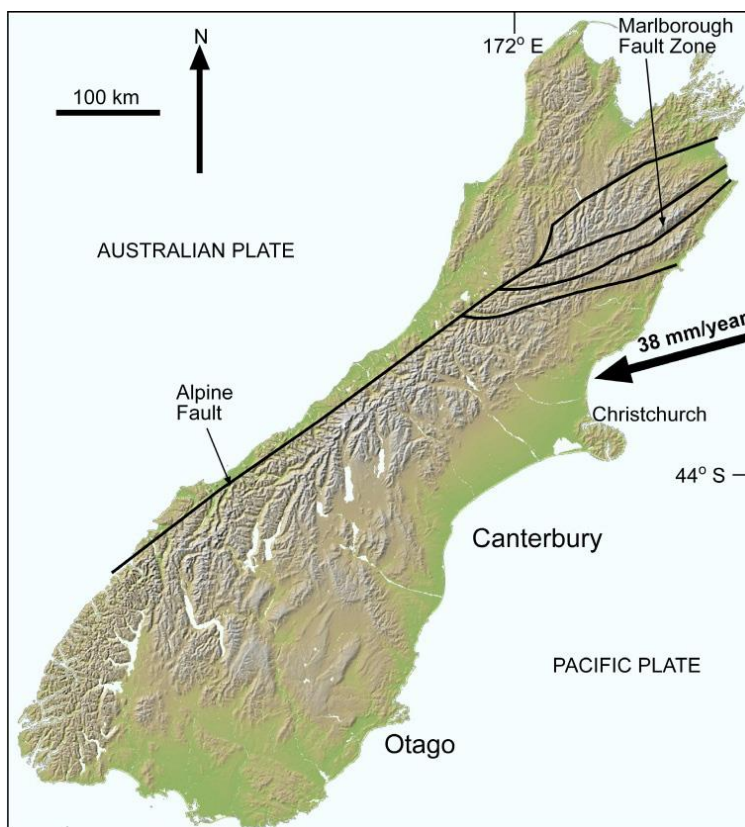


Figure 9: Topographic map of the South Island of New Zealand showing urban settlement of Christchurch on the east coast. The Alpine Fault and other main faults at the boundary between the Pacific Plate and the Australian Plate. [image online]. Available from <<http://www.geographx.co.nz>> [Accessed on 19 March 2013]

The landscape of Christchurch was altered by draining and infilling of hollows during colonisation in the 1850s (Brown and Weeber, 1992). Figure 10 is a compilation of maps providing information on the original landscape of Christchurch. The map (Figure 10) shows three main geomorphic areas that are easily recognised: the river floodplain through the centre, the coastal margin to the east, and the volcanic region to the south.

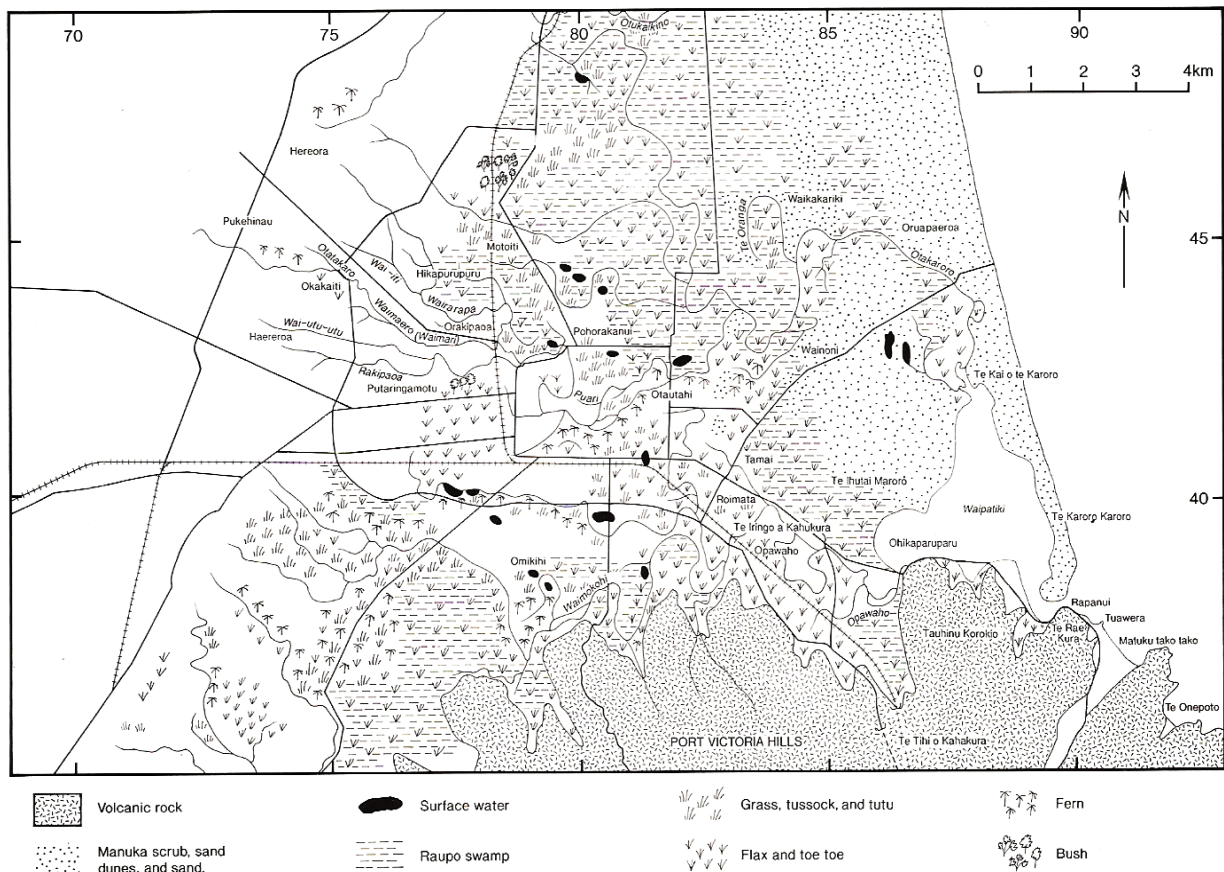


Figure 10: Christchurch area showing waterways, swamps, and vegetation cover in 1856. Adapted from "black maps" compilation by K. Silby, Christchurch Drainage Board (cited in Brown and Weeber, 1992, p.13). The original plan for the City of Christchurch is located within the centre of Figure 10

The coastal margin has changed over the years (Figure 11) extending to the extinct volcano enabling a flat landscape from which early colonists could design and build their new city. The map (Figure 11) showing the changing shorelines of the eastern coastline caused by postglacial marine

transgression and progradation is calculated from the radiocarbon dating of selected samples taken from the Christchurch area.

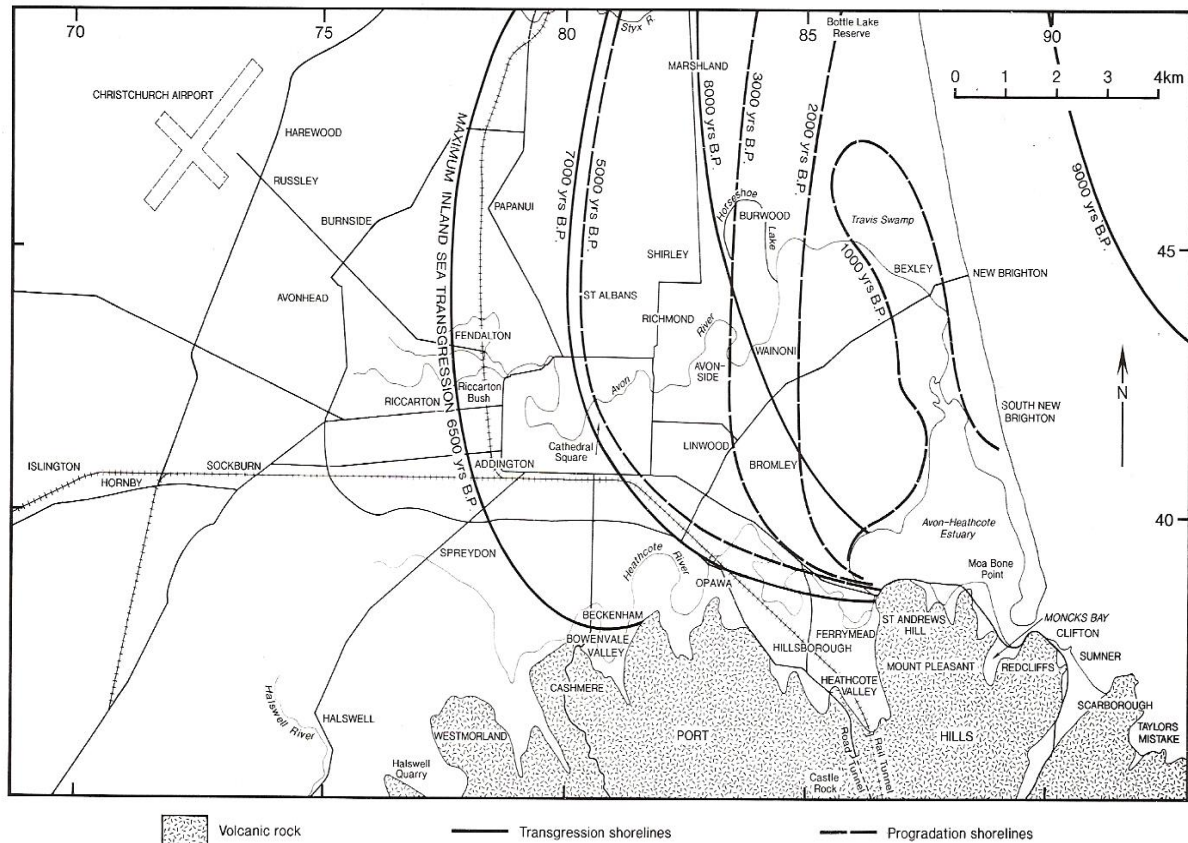


Figure 11: Changing shorelines of the eastern coastline caused by postglacial marine transgression and progradation. (Brown and Weeber, 1992, p.14)

The volcanic region (Figure 12) was once an island but now is joined to the mainland; its lava flows to the north from the Port Hills to the south of Christchurch. The sand along the eastern coastline is the ground-up remains of the Southern Alps. (Brown and Weeber, 1992; Coates, 2002). Figure 12 expands to include the northern part of the Canterbury province with a geological perspective to the landscape. The location of the Waimakariri River and the Port of Lyttelton are landmarks with regards to historical flooding and locations of recorded tsunami waves.

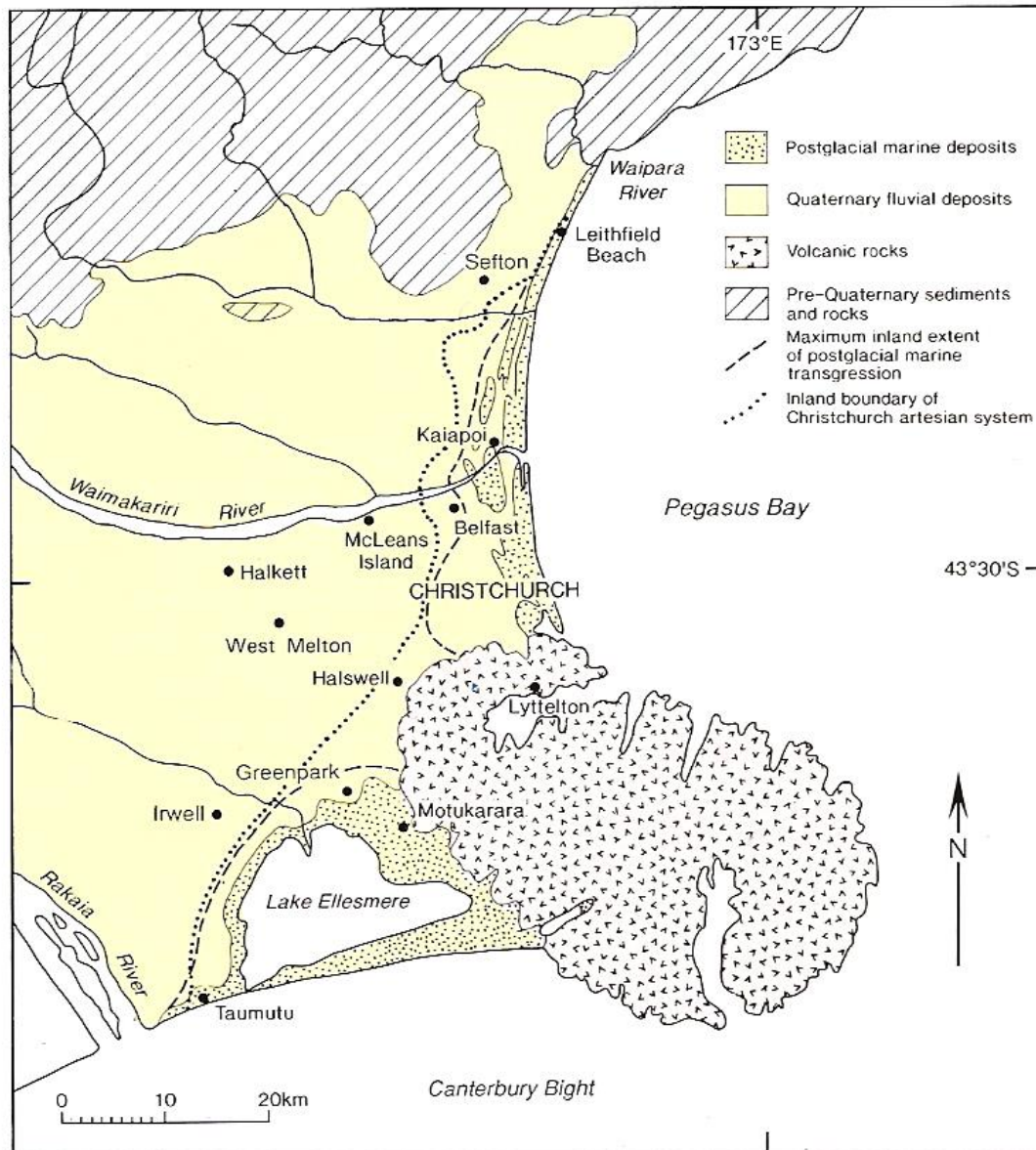


Figure 12: North Canterbury postglacial marine transgression and boundary of the Christchurch artesian system. The Waimakariri River is located north of the City of Christchurch. The port of Lyttelton is the eroded caldera of an extinct volcano. (Brown and Weeber, 1992, p.13)

4.3 Natural events in the Canterbury region

Soon after the founding of Christchurch in 1850, the new settlers experienced their first flood from the overflowing waters of the Waimakariri River entering the new city along old river channels (Brown

and Webber, 1992). Three floods occurred in the Avon River from 1850 to 1868 with surface flooding through the city. An extensive system of stopbanks and groynes was constructed along both banks of the Waimakairiri River to control the lower 40km away from the city (www.geerassociation.org).

In August 1868, an earthquake offshore from Chile in South America generated the first recorded tsunami in the Port of Lyttelton (www.teara.govt.nz). The water drained from the harbour (location shown in Figure 12) and then a wall of water surged into the harbour causing heavy damage to the ships in port.

The following year, the new settlers of Christchurch experienced their first major earthquake of 5.75 magnitude on 5th June 1869 located 10km east from the city centre (Brown and Weeber, 1992). Severe shaking also occurred on 1 September 1888 at 4.10am (causing damage to the Cathedral spire, Figure 13), and during the years 1901, 1922, 1987 and 1994.

Regardless of Christchurch's proximity to the tectonic plate boundaries and residents' experience of ground shaking, since colonisation no faults in the Christchurch area have been active. Leading to this assumption by Brown and Weeber (1992, p.78) in their report on the 'Geology of the Christchurch Urban Area' as quoted:

"The nearest onshore active fault to Christchurch is the Ashley Fault 20km to the north. The nearest offshore fault is the Pegasus Bay Fault about 20km to the northeast. On this evidence it is unlikely that Christchurch would experience primary fault rupture or uplift, subsidence, or tilting associated with large earthquakes centres on nearby active faults."

Prior to the Canterbury earthquake of 4 September 2010, the only cause of concern for Christchurch residents was the possibility of a major earthquake from movement of the Alpine Fault.

Christchurch was considered a 'safe' city and commercially marketed as the 'Tourism Gateway' to the South Island.

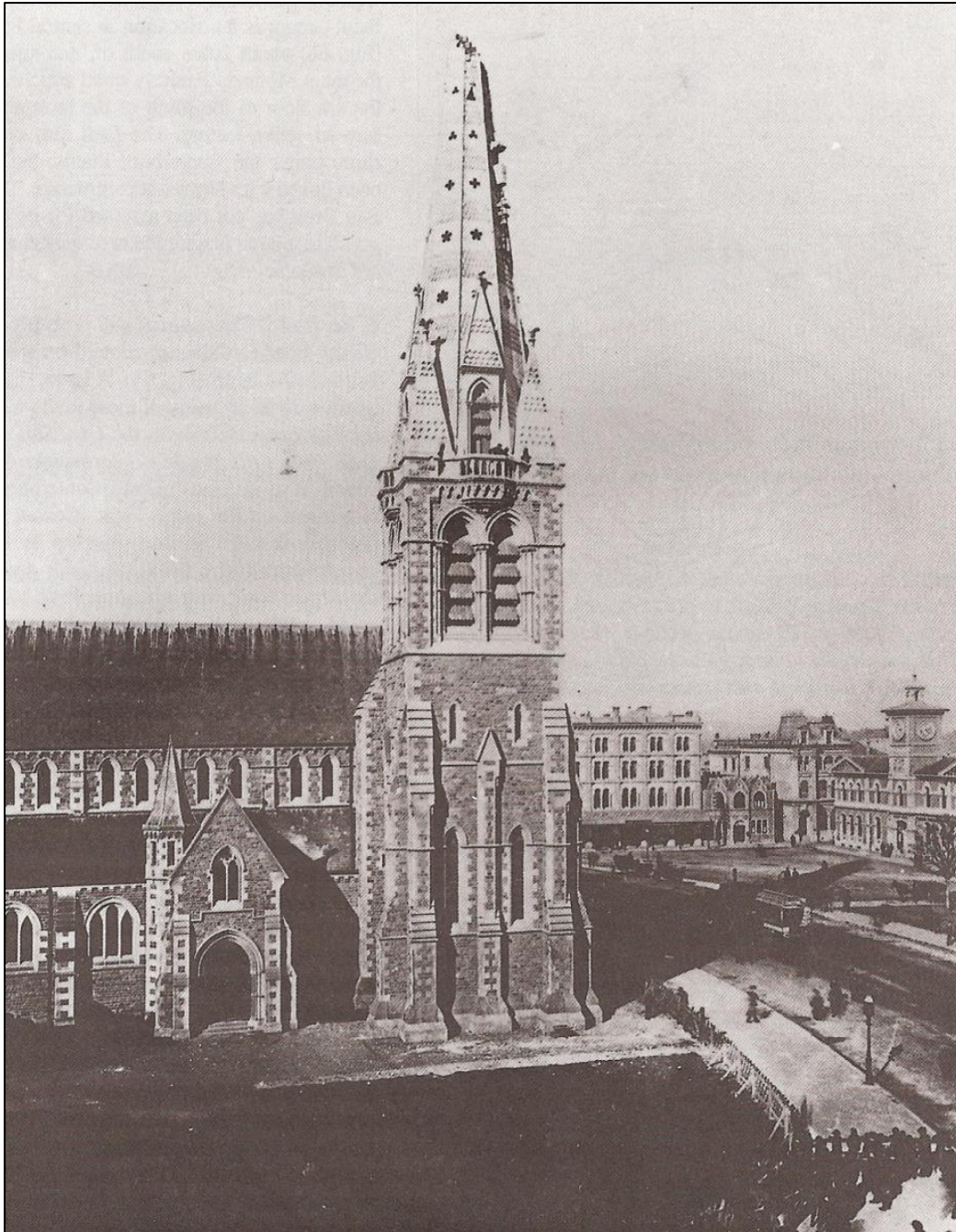


Figure 13: Earthquake damage to the Cathedral Spire. Christchurch on 1st September 1888. The spire was rebuilt in copper plating. (Brown and Weeber, 1992, p.79)

Canterbury earthquakes of 2010 and 2011

Like many modern societies, the residents of Christchurch have been informed by state agencies to prepare for a natural disaster, either from movement of the Alpine Fault, flooding from the Waimakariri River or a major tsunami. Residents were not informed to be prepared for an earthquake centred within the city limits. Contrary to earlier reports on the location of fault lines in the Canterbury region, the Canterbury earthquakes during 2010 and 2011 have resulted in surface fault ruptures, uplift, subsidence and ground tilting.

Table 4: Three largest chronological seismic events in the Canterbury region during 2010 and 2011

Data	First Seismic Event	Second largest Seismic Event in the aftershock sequence (chronologically)	Third largest Seismic Event in the aftershock sequence (chronologically)
Location	Darfield (40kms west from the CBD of Christchurch)	2kms from the town of Lyttelton (10km from the CBD of Christchurch)	Redcliffs, Christchurch
Date (NZ Standard Time)	Saturday, 4 September 2010 at 4:35 am	Tuesday, 22 February 2011 at 12:51 pm	Monday 13 June 2011 at 2.20 pm (there was also an earlier seismic event at 1pm)
Epicentre	43.55°S, 172.18°E	43.58°S, 172.68°E	43.57°S, 172.73°E
Focal Depth	10 km	5 km	6.92 km
Maximum Intensity Mercalli	MM 9	MM 9	MM 8
Magnitude Richter	M _w 7.10	M _w 6.34	M _w 6.41
Deaths		185 deaths	
Known locally	Canterbury quake	Christchurch quake	June 2011 Christchurch quake
Seismic faults	Greendale fault (new surface rupture)	Port Hills Fault (new hidden fault)	
Sourced from:	< http://info.geonet.org.nz/display/quake/M+7.1%2C+Darfield+%28Canterbury%29%2C+4+September+2010 > Accessed on 10 Sept 2012	< http://info.geonet.org.nz/display/quake/M+6.3%2C+Christchurch%2C+22+February+2011 > Accessed on 10 Sept 2012	< http://www.canterburyquakelive.co.nz/QuakeMap/Single/?Index=4016 > Accessed on 6 November 2012

During 2010 and 2011, three large seismic events in the Canterbury region of New Zealand caused widespread damage and the deaths of 185 people (refer to Table 4). Prior to 2010, very few

residents of Canterbury had experienced an earthquake of this magnitude or any other kind of urban natural disaster.

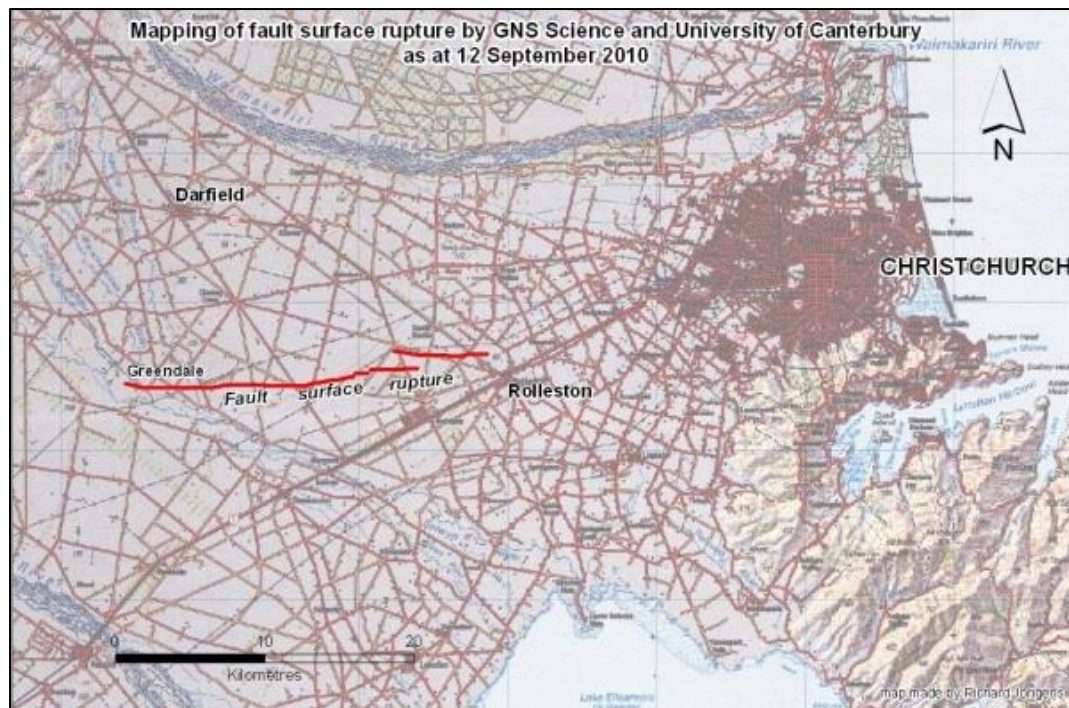


Figure 14: Location of the Greendale Fault relative to Christchurch. [image online]
Available from <http://www.fig.net/pub/monthly_articles/september_2011/september_2011_blick_beavan.html>
[Accessed on 16 April 2013]

On Saturday 4 September 2010 at 4.35am (NZ time), a 7.1 magnitude earthquake, centred 40km west of the Christchurch Central Business District, caused widespread damage with disruption to water, power and sewerage services (refer to Table 4). The previously unknown Greendale Fault ruptured to the ground surface, causing up to 5 metres horizontal and 1 metre vertical permanent offset of the ground (<https://quakestudies.canterbury.ac.nz>). The new surface feature in a lightly populated rural area of Greendale, near the township of Darfield, spanned a total length of 29.5km deforming land between 30m and 300 m in width (refer to Figure 14). No deaths occurred, but schools were closed during the following week and communities coped with liquefaction,

aftershocks and change. School students were at home and supervised by their parents when this earthquake struck. Many school aged students shared this experience with family members.

On Tuesday 22 February 2011 at 12.51pm (NZ time), a 6.3 magnitude aftershock centred 6.8km from the Christchurch Central Business District (CBD) at a depth of 5.87km jolted the city causing multi-storeyed buildings within the CBD to collapse (refer to Table 4). This earthquake struck at a shallow depth almost directly below Christchurch. Recorded peak ground acceleration (PGA) reached up to 2.2 g (vertical) and 1.7 g (horizontal) at 2 km from the epicentre and up to 0.8 g (vertical) and 0.7 g (horizontal) in the central city (Kaiser, et al., 2012). Peak accelerations were the highest recorded in a New Zealand earthquake and among the highest recorded worldwide (Kaiser, et al., 2012). The acceleration response spectra exceeded the 2500 year building design codes and estimates based on standard New Zealand models (Kaiser, et al., 2012).

The fault this time was located within the Port Hills near Lyttelton, the port of Christchurch. This fault was named 'The Port Hills Fault', and remains hidden below the surface. A total of 185 people died as a result of injuries sustained from the impacts of this aftershock. Schools were closed once again and entry to the CBD was regulated while urban rescue teams completed a search of all buildings.

Tuesday 22 February 2011 was not a regular school day for secondary school students in state or state-integrated schools. Secondary school teachers employed in government schools were attending a half-day paid union stop work meeting in the Christchurch Town Hall. Schools were operating half-days enabling all teachers to travel to the Christchurch Town Hall located in the CBD. At the time of this aftershock, secondary school students were either arriving at school for the afternoon or leaving school to return home as their school would be closed in the afternoon. Their teachers had either left the Christchurch Town Hall and were returning to school, or they were

arriving at the Christchurch Town Hall for the afternoon session that was to commence at 1pm.

Unlike September 4th, this time many students were not supervised, some walking home in groups or alone.

Although, no secondary school students died from collapsed school buildings, it is respectful at this part of my thesis to remember the students that did die on 22 February 2011. One secondary school student that was at school during the morning travelled into the city on a bus, as school was closed that afternoon. The bus he was travelling on was stationary alongside a building that collapsed onto it during the aftershock. He died from his injuries. Also, International tertiary students and teachers died when the CTV building that housed their English speaking school collapsed in the CBD.

On Monday 13 June 2011 at 2.20pm (NZ time) at 6.3 magnitude aftershock rocked the residents of Christchurch resulting in no deaths but causing more structural damage and further liquefaction. The epicentre was in east Christchurch near the coastline. Schools were open at this time and students experienced this earthquake while under the supervision of teachers and staff.

Following the initial Canterbury earthquake on 4 September 2010, a total of 7814 aftershocks were recorded before the second largest aftershock struck on 13 June 2011. All earthquakes since the initial earthquake on 4 September 2010 at 4.36am are scientifically considered as aftershocks following a predicted earthquake sequence (www.geonet.co.nz). But locals talk about the February aftershock as the 'Christchurch Earthquake', as those that lost their life were located within the City of Christchurch and the epicentre was now further east across the city at a different fault line.



Figure 15: City of Christchurch: residential in foreground (homes built on lava flows forming the Port Hills), CBD in middle, Southern Alps in the background. (Authors own photo taken from Balmoral Hill in August 2008).

4.4 The history of urban settlement in Christchurch

The first inhabitants, of what would eventually be the city of Christchurch, camped in caves around the Port Hills. Radiocarbon dating shows these people occupied Moa Bone Cave (Te Ana O Hineraki) near Redcliffs about 1400 A.D. (Trotter, 1975, cited in Brown and Weeber, 1992, p.10). Later, the Maori chief Te Potiki Tautahi arrived and found the swampy environment provided a stable food source of small fish, eels, swamp hens and wild ducks. Maori did not originally settle in the swamp instead preferring to live north of the Waimakariri River at Kaiapoi. (Brown and Weeber, 1992)

The Deans brothers were the first European settlers to arrive in Canterbury and established their home in Putaringamotu (Riccarton) in 1843 (Morrison, 1948). In 1847, a comprehensive plan encompassing the ideas of Edward Gibbon Wakefield was outlined by the Association for 'Founding the Settlement of Canterbury in New Zealand' (Morrison, 1948). The original site of Christchurch in 1850 was on a dry and slightly elevated area now occupied by the Central Business District (CBD). The original city plan is mapped in Figure 16 and details an organised 'checkerboard' structure of sections within one square mile.

As a result of the Wakefield scheme of colonisation, by 1870 Christchurch had become an orderly English-style town with well-built houses, trees and pleasant gardens. The Avon and Heathcote Rivers also played a role in determining the lines of settlement (Morrison, 1948). Many well-known early residents built their first dwellings on the river banks encouraging the development and progress of the suburban communities outside of the original city plan (Figure 16).

The Progress of Suburban Communities

By 1876, small communities settled in the lands surrounding the original city plan of Christchurch (Figure 16). High status growth occurred in north-west Christchurch on agricultural land originally

owned by the Fendall Family, now called Fendalton. Middle-class businessmen and their families settled along the Heathcote River in Opawa, which originally was a rural dairy locality to the south-east of Christchurch. The working class lived within the industrial suburbs of Sydenham to the south, Linwood to the east, and Woolston to the south-east. (Morrison, 1948)

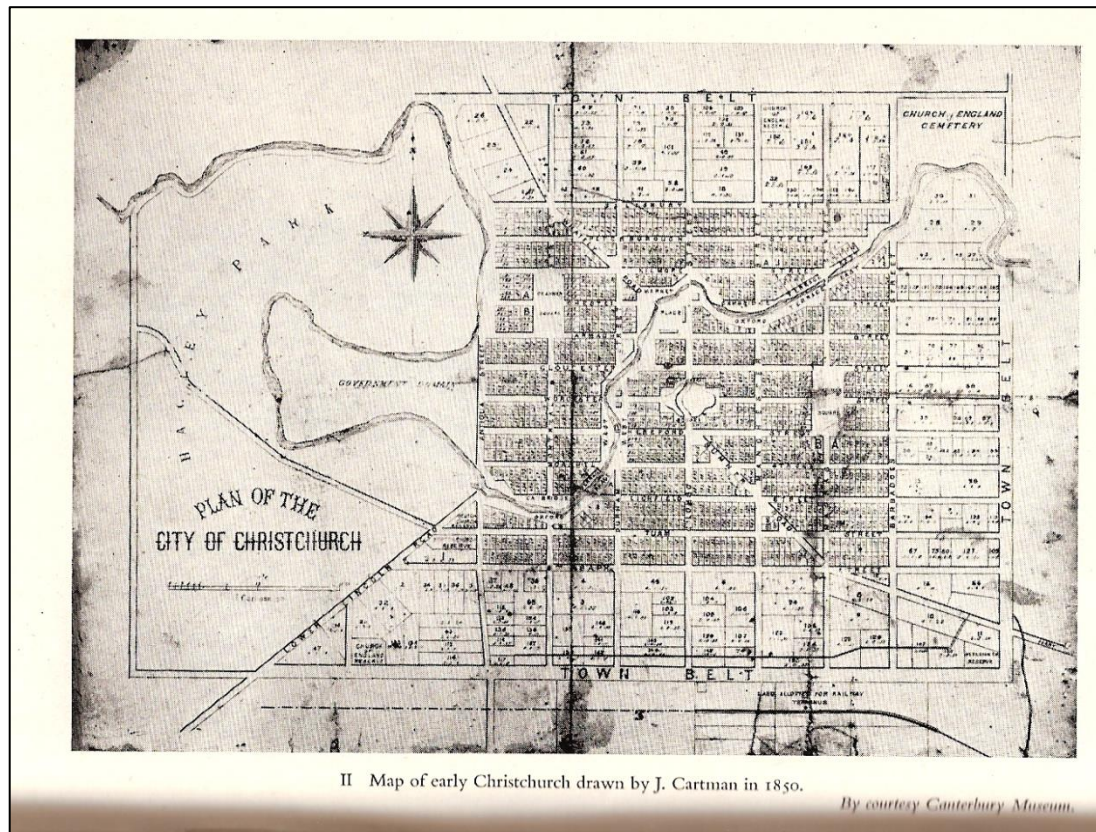


Figure 16: Plan of the City of Christchurch drawn by J. Cartman in 1850. (Morrison, 1948, p.190)

The growth and spatial expansion of the high status area in the north-west of Christchurch kept pace with population growth and this outward movement was accomplished with a continuation of high status area contact with the commercial centre (Webster, 1975). The progress of suburbs outside of the original city plan resulted in social stratification where occupational, educational and income differences were evident and this led to residential segregation (Webster, 1975). The early urban

spread of Christchurch occurred in sectoral patterns of socio-economic status not concentric zonal patterns, and this was due to the existing land use in this area. Sectoral patterns of high status growth occurred when a sector of farmland, for example Fendall's Farm in north-west Christchurch, was divided and sold within families of high status. The residential differences in socio-economic status and segregation was also observed in family status, for example, non-family groups lived in rental areas where family groups often owned their home and lived in low density housing areas (Webster, 1975). The high degree of residential segregation in Christchurch was not egalitarian in nature.

The study of industrial growth in Christchurch shows why certain industries were established in the city and its suburbs, why they are to be found in particular locations and what, if any, was their effect on the settlements in these districts, and on the subsequent growth of the city of Christchurch. The progress in the establishment of local governments through Borough and District Councils gave residents political power and identity. The boundaries of each council unified the residents within them and segregated them residentially from other neighbouring districts. In Sydenham, for example, new factories and light industries were built in residential areas, no zoning existed, and new factory workers were found within the borough.

An example of the political of power and identity of residents is found in the working class suburb of Sydenham. This suburb, in south Christchurch, was granted permission to declare their community a borough in 1877 providing them with their own local government. The Sydenham community extended from Addington in the south-west to Waltham in the south-east. Within the boundaries of the new Sydenham Borough Council was a large growing progressive residential working class population with a railway line, railway workshops (1879), gas works (1878), tram lines, a post office,

its own Fire Brigade and a gaol. The Sydenham Borough Council became a model for other communities outside of the original city plan of Christchurch (Figure 16). (Morrison, 1948)

In 1903, Christchurch was the chief industrial centre of New Zealand with a town population of 42,286 inhabitants scattered over an area of 5,610 acres, with an additional population of 57,000 living in districts bordering the municipal boundaries (Morrison, 1948). The original city of Christchurch was planned but the growth of the communities outside of the original plan was not and “its governing councils have shown an astonishing lack of forethought in not continuing to plan and guide its growth” (Morrison, p.103, 1948). The 1850 city plan (Figure 16) had no planning for suburban growth areas outside of the city boundary.

By 1930, the elite north-western area extended to the urban fringe and at the same time retaining contact with the central city area (Webster, 1975). The north-west of Christchurch was now surrounded by the remainder of the population. Predicted patterns of urban change, social decline and re-distribution of socio-economic groups occurred in Opawa but not Fendalton which to this day remains a segregated residential community of high status households. The elite, place a high price on land and housing, and use it as a means of separating themselves residentially from lower social groups (Webster, 1975).

Following the Second World War, suburban growth expanded around Christchurch including the eastern suburbs between the inner industrial suburb of Linwood to the outer coastal suburb of New Brighton. The sand dune ridges within east Christchurch had been responsible for the low rate of development and sparse population (Webster, 1975). Although the land was relatively flat, the soils and drainage remained a factor in residential development (refer back to Figure 10). An urban fence was placed around low lying land and natural wetlands surrounding the estuaries of the

Heathcote and Avon Rivers (CCC report 1967), which remained undeveloped residentially until after the Resource Management Act of 1991.

The Resource Management Act (RMA) replaced a large number of acts including the Town and Country Planning Act and the Water and Soil Conservation Act. The 'green belt' and the 'urban fence' were removed around Christchurch and urban development spread. Although the RMA in 1991 should have incorporated sustainable management practices it was driven by neoliberal market political policies.

The laissez faire development policies of the Christchurch City Council from the 1990s onwards put many low SES people at risk in the name of 'housing affordability'. Coastal wetlands were drained for residential housing development, although there was plenty of land available in other parts of the city area. But cheap land that was once near a coastal city dump or a wetland would provide a rateable value and financial returns for both the local government and the land developer. The land values were low and attracted low SES groups. The role of sustainable urban planning did not factor in considering the risks from natural disasters which are often greater for low SES groups.

(www.greaterchristchurch.org.nz)

Introduction of state neoliberal policies also changed the fabric of working class communities in Christchurch. Sydenham maintained a thriving community with a railway industry up to the introduction of neoliberal policies in the 1980s which deregulated state assets and the Addington Railway Workshops, where once 2000 men were employed, was sold. This resulted in the increase of deprivation within the area widening the gap between social classes which is shown in the latest Census data available on Figure 17.

The deprivation map calculated from the latest Census data available (Figure 17) shows low socio-economic communities in yellow while advantaged communities are in blue. The location of Sydenham is shown within the red box south of the Central Business District (CBD). Early industrialised suburban communities of Linwood and Woolston, mentioned earlier in this section, are now low SES communities. Linwood is north-east of Sydenham, while Woolston is east of Sydenham, both suburbs contain meshblocks (each containing 60-70 households) of highly deprived households. Patterns of high SES households are situated within the inner north-west of Christchurch's CBD. The larger meshblock shapes indicate lower density housing. Some bright yellow low SES residential meshblocks along the coastline east of the CBD indicate areas of drained wetlands.

To further understand how education provision, location and selection assisted in the establishment of Wakefield's scheme of colonisation within the new settlement, an introduction to Greater Christchurch Schools and their history now follows.

4.5 Greater Christchurch secondary schools

Greater Christchurch secondary schools include all secondary schools within the Christchurch City Council, and the adjacent Selwyn District Council and Waimakariri District Council. Although this geographical region is larger than the City of Christchurch (refer to Figure 18) it comprises of the region affected by the Canterbury earthquake and subsequent aftershocks during 2010 and 2011.

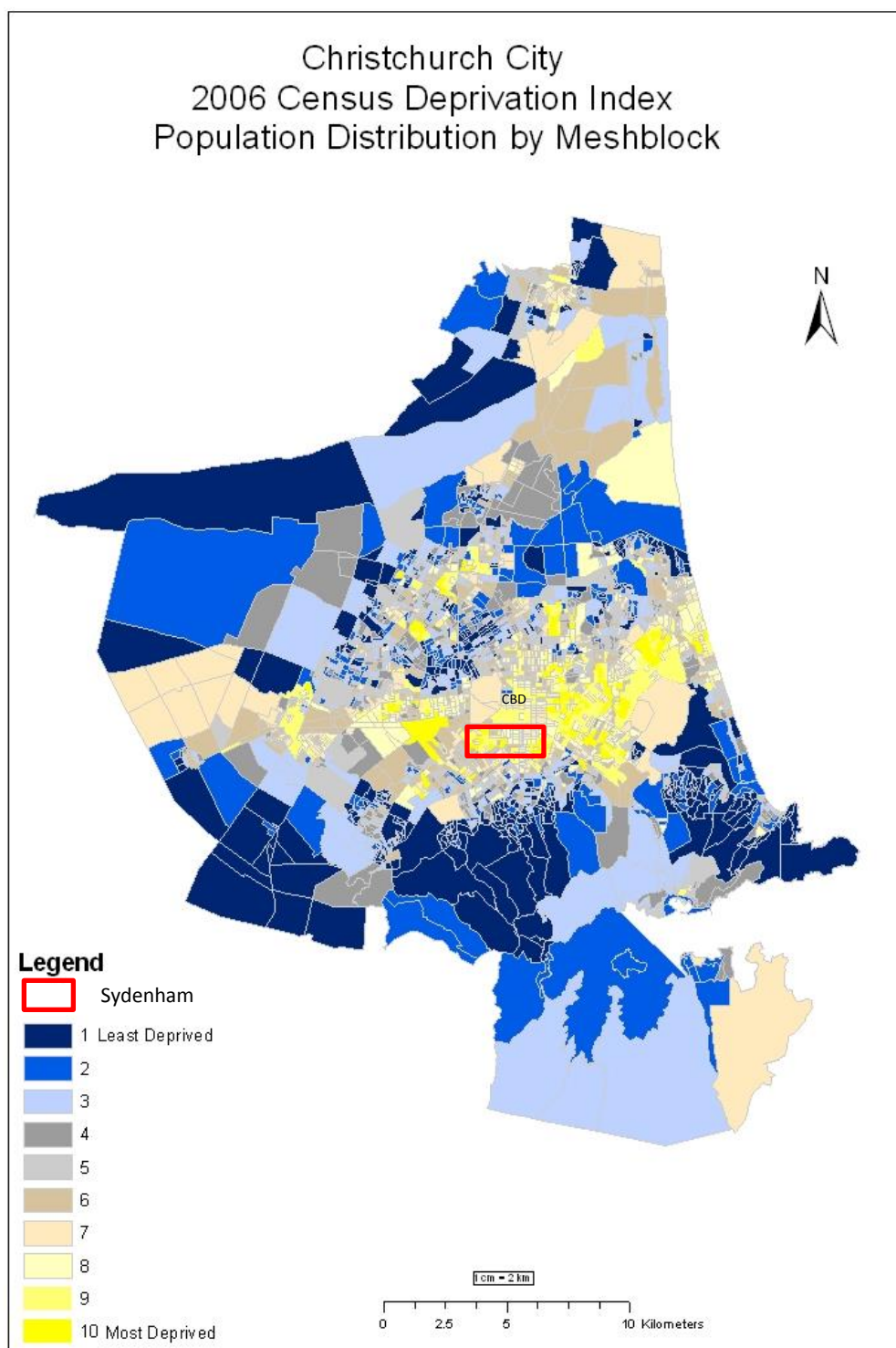


Figure 17: 2006 Deprivation Map of Christchurch (latest census data available). Image compiled in ArcGIS by Author.

Prior to the Canterbury earthquake, there were a total of 215 schools and three tertiary institutions in the greater Christchurch region (www.minedu.govt.nz). The Canterbury education sector in 2009 had an operating revenue of \$1.31 billion (NZD) and employed 11,000 people (www.minedu.govt.nz). International education generated \$200 million a year and supported 2,000 jobs (www.minedu.govt.nz). Education was a major enterprise in Canterbury region.

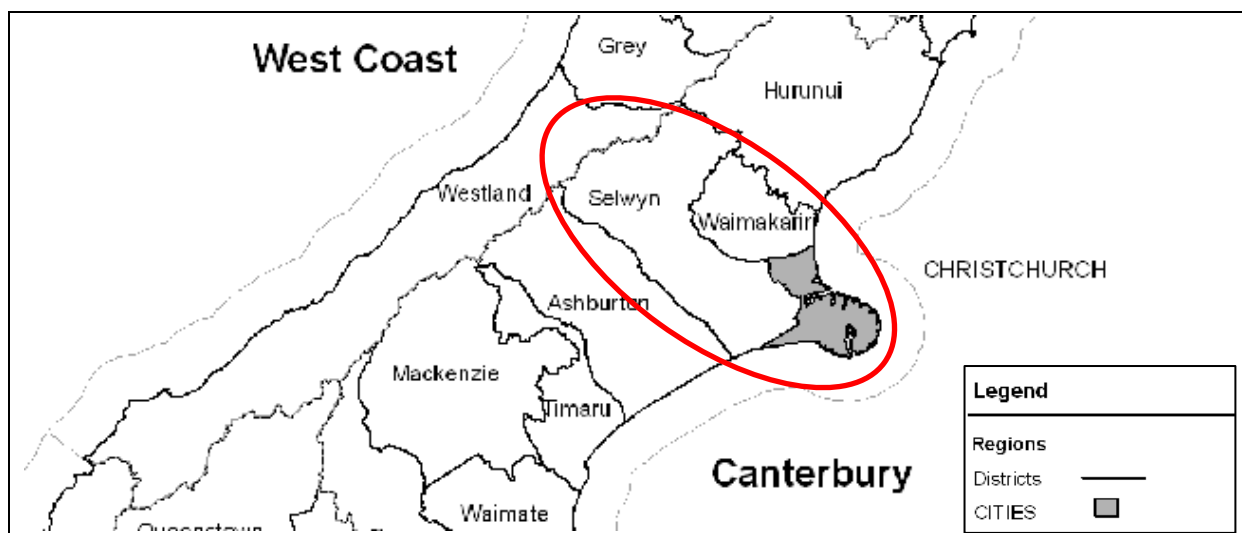


Figure 18: Regional Council and Territorial Authority Areas in 2009. [online image].
Available from <http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/demographic-trends-2009/~media/Statistics/browse-categories/population/estimates-projections/demographic-trends/2009/South-Island.gif?w=854&h=1036&as=1> [Accessed on 20 March 2013]

This following section covers the introduction and history of secondary school education in the Canterbury region and government intervention into education following the Canterbury earthquake. All information regarding the education performance of secondary school students in Canterbury is shown in the results section of Chapters 6 and 7.

4.5.1 History of Christchurch secondary schools

Schools in New Zealand are currently recognised as either being State, State-Integrated or Independent. The state school system in New Zealand was formally established by the Education

Act in 1877, and placed all public and primary education in New Zealand under government departmental control. While some schools remained, numerous small private and church schools closed as their students entered the state system (Lynch, 2000). In 1936, the requirement to pass the proficiency examination before entry to secondary school was abolished (Simons, 1980).

In 1975, The Private Schools Conditional Integration Act ('Integration Act') enabled Private Independent schools to become integrated schools. Under the terms of the Act, integrated schools became part of the state school system. These predominantly religious schools became State schools and were subject to the same legal provisions as other state schools, except that they were able to preserve their 'special character', which was mainly religious. (Lynch, 2000)

The Integration Act of 1975 has allowed many Independent schools to survive through becoming Integrated schools and at the same time retaining their religious character. If the Private Schools Conditional Legislation Act had not passed in 1975, many schools would have closed. The Integration Act breathed new life into religious schooling and represented a life-line of survival and growth. (Lynch, 2000)

Independent schools which have stayed out of the state system have done so for a variety of reasons. Lynch (2000) states that "Principally, they treasure their independence and do not want to have the state 'meddling' in their ability to provide an alternative independent education" but also they have the financial means to remain independent. Government funding for these schools has varied over the last thirty seven years.

The 160 years of secondary education in New Zealand, has been characterised by three major factors (Simons, 1980):

1. At first, schools were developed upon a socially selective principle. Early secondary schools were elitist by the curriculum they taught, the values they upheld and the fees they charged.
2. A majority of early schools were located near residential areas of high status.
3. Secondary schools were developed by either the State, the Roman Catholic Church, or various Protestant churches.

Each secondary school had a specific reason and unique philosophy behind its establishment and these were expressed in both the character and location. The selective process was hard to reform as quoted by Charles Bowen, M.P. in 1877

“The higher branches of education may be taught upon payment of a fee – a sufficient fee- and there is also provision for scholarships which enable children of unusual attainments and ability to carry on their education. It is not intended to encourage children whose vocation is that of honest labour to waste in high schools, time which might be devoted to the learning of a trade when they have got no special talent by which higher education might be made immediately useful” (Campbell, A. E, pp.112)

Primary education was promoted for all children, while secondary education was for the selected few, which then introduced educational inequalities in Christchurch (Simons, 1980). Large numbers of children received primary education and may have made good use of secondary education had it been available to them. The location of secondary schools therefore directly contributed to the growth of residential segregation in New Zealand cities and Christchurch was no exception.

Selective policies in education and the growth of residential segregation in Christchurch

The selective philosophies which motivated the very first schools resulted in locational inequalities which along with decile ratings and school enrolment schemes contributed to the growth of residential segregation in Christchurch, which still exists today. Following the establishment of New Zealand’s second university in Christchurch during 1873, distinctive neighbourhoods developed in

Christchurch were a middle class child could expect to attend primary and secondary school, and then study towards a university degree. Most of the lower class students at the end of the nineteenth century received an education aimed at basic literacy. When they left school for a career at about the age of ten, most had probably never seen a secondary school from a distance due to the placement of secondary schools away from lower class neighbourhoods. (Simons, 1980)

Within the working class communities of Woolston and Sydenham, no academic secondary schools were established. Primary school education was available for all and there was plenty of labouring work available. While there is a strong correlation between socio-economic status and education performance, the primary school leavers of the first strong working class communities in Christchurch did not have the opportunity for academic secondary school education. The children of Sydenham never saw a secondary school within their borough instead they had access to technical colleges, established from 1907, which did not offer a curriculum designed for academic training or university success. The Technical High, Christchurch West District High and New Brighton District High offered no threat to the existing social structure which benefited the children of Christchurch's elite (Simons, 1980).

Today, secondary schools are located throughout the greater Christchurch region. But, distinctive middle-class neighbourhoods still exist where school age children may attend high decile schools (where low decile schools are the most socio-economically disadvantaged) throughout their state school education. High decile schools with school enrolment zones are one of the processes that persistently advantage the middle class.

Christchurch Secondary Schools

In 1866, there were three secondary schools in Christchurch; Christ's College, The Christchurch Academy, and St. Leos. Christ's College, an independent school for boys, still exists today on the

same site. The Academy and St Leos both closed down in 1874 and 1885 respectively. In 1874, the first private school for girls was opened in Middleton Road, Upper Riccarton, but later moved and was acquired by Mrs Bowen in 1890. (Murdoch, 1943)

By 1900, Christchurch had seven secondary schools; three state run, three independent, and one Roman Catholic (now State-Integrated). The state schools were Christchurch Boys' High School, Christchurch Girls' High School and Christchurch West District High School. Three independent schools were Christ's College for boys, Mrs Bowens for girls, and the Graham sisters for girls. The one Roman Catholic School was St Mary's for girls. (Davey, 1928; Murdoch, 1943)

In 1930, Christchurch had nine single gender secondary schools that are still operating under the same name today. Christchurch Boys' High School and Christchurch Girl's High School are state schools and although they have moved from their original sites they have maintained a student composition that rates them both as a socially advantaged decile 9 school. Avonside Girls' High School, now a decile 6 school, was originally established by the Board of Christchurch Girls' High School and located in inner east Christchurch became a separate high school in 1927. Catholic education is a compulsory subject and the 'special character' of both Villa Maria College and St Bede's College which are now State-Integrated decile 9 schools. There are four Independent (private) schools with decile 10 rating; Christ's College, St Andrew's College (originally for boys only and now educates both girls and boys), St Margaret's College and Rangi Ruru College for girls. All nine schools have students achieving well in national examinations. (Murdoch, 1943; Cresswell, 1956)

In 1936 and in response to new population growth in the northern half of Christchurch, Papanui High School was built, the first of many mixed gender state high schools in the region that still remain operational and on the same site today. Following the Second World War, Linwood College in east

Christchurch was founded in 1954, followed by Cashmere High School (1956) in south Christchurch and Riccarton High School (1958) in west Christchurch. Shirley Boys' High School (1957) provided an all-boys education to families living in east Christchurch (the girls had been able to attend Avonside Girls' High School since 1919). To the east, Aranui High School (1960) was built, then to the north-west, Burnside High School (1960), south-west Hillmorton High School (1961), south-east Mairehau High School (1961). Hornby High School in east Christchurch was founded in 1975. The current decile rating of each school is listed in the results of Chapter 6.

The decile rating of each secondary school provides parents with an understanding of the socio-economic status of the student composition. The average decile rating for a secondary school located north of the CBD is a 9, which indicates a high SES, while the average in east Christchurch is a 4, which indicates a low SES community. The low SES eastern communities are living on land with lower land values, sandy soils including recently drained wetlands (refer back to Figure 10).

Aranui High School (decile 2) and Mairehau High School (decile 4) were both built in the early 1960s and are located in east Christchurch. Neither school required state intervention into a site sharing agreement following the Canterbury earthquakes. However, six other Christchurch secondary schools, located in east or central Christchurch, did require re-location due to safety, land and building damage. There were Linwood College (decile 2), Catholic Cathedral College (decile 3), Avonside Girls' High School (decile 6); Shirley Boys' High School (decile 6); Unlimited Paenga Tawhiti (decile 6), and Marian College (decile 7). The following section examines the impacts of the Canterbury earthquakes on secondary schools and the state interventions that took place.

4.6 Impacts of the Canterbury earthquakes on greater Christchurch schools

Following the Canterbury earthquake on 4 September 2010, the Ministry of Education closed all schools in Christchurch, Waimakariri, and Selwyn districts in the best interests of safety to allow time for structural assessments of school buildings and grounds (www.minedu.govt.nz). Boil water notice for Christchurch was lifted on 8 September 2010 and schools reopened over the next week following approval to occupy after the inspection was completed.

The Christchurch earthquake of 22 February 2011 caused widespread damage, especially in the central business district and eastern suburbs. The Ministry of Education closed all schools once again. A media release dated Sunday 27 February 2011 advised thirty four state, state-integrated and independent schools had major damage, with some needing to be completely rebuilt, while a further one hundred other schools suffered minor damage (www.nzherald.co.nz). Schools in the Waimakariri and Selwyn Districts could open from 28 February 2011 if they could satisfy health and safety requirements. This news prompted many families to seek alternative education providers for their school age children but school enrolment zones hindered this process.

On 1 March 2011, the Ministry of Education announced earthquake damaged Christchurch schools, unable to re-open would either have the option of setting up prefabricated classrooms on site or temporarily moving to a new school site and site sharing with that school. Several secondary schools, with damaged school buildings, remained on site and prefabricated classrooms were moved onto green spaces within the school grounds as substitute classrooms. Six secondary schools became visiting schools and entered into site sharing arrangements with six host schools. This was a controversial time for both host and visiting school communities with reduced teaching times and school hours for both schools, even though the host school was relatively undamaged. Many school

communities were still grieving. All host schools took on equivalent decile or lower decile visiting schools.

4.7 State interventions during 2011 into the education of Christchurch schools and students following the Christchurch earthquake on 22 February 2011.

The State moved quickly to commence intervention into helping students in the region affected by the Christchurch earthquake on 22 February 2011. Firstly, the Education Act of 1989 was reviewed and temporarily amended. Secondly, site-sharing agreements were put in place. Thirdly, students were provided free transport by bus to their new displaced school. Finally, following further school closure due to major aftershocks in June and two heavy snow falls, an effective plan was developed for student assessment through establishing an 'Earthquake Impaired Derived Grade' process.

These interventions will now be discussed further within this section of the chapter. The effects of these interventions on students' national examination results are analysed in Chapter 6.

Table 5: Site sharing secondary schools during 2011

Host School	Decile	Host School hours (approx.)	Visiting School	Decile	Visiting School hours (approximately)	Site-sharing duration
Cashmere High School	8	8am – 12.30pm	Linwood College	2	1-5.30pm	28 March 2011 until 15 July 2011 (end of Term 2)
Burnside High School	8	8am - 12.30pm	Avonside Girls' High School	6	1-5.30pm	14 March 2011 until end of school year (Dec 2011)
Papanui High School	6	8am – 12.30pm	Shirley Boys' High School	6	1-5.30pm	7 March 2011 – 9 Sept 2011
Halswell Residential College		No change.	Unlimited Paenga Tawhiti	6	Normal school hours	14 March 2011 until end of year (Dec 2011)
St Thomas of Canterbury College	8	8am – 12.30pm	Catholic Cathedral College	3	1-5.30pm	14 March 2011 until 15 July 2011 (end of Term 2)
St Bede's College	9	8am – 12.30pm	Marian College	7	1-5.30pm	21 March 2011 until end of school year (Dec 2011)

State Intervention No. 1: Canterbury Earthquake (Education Act) Order 2011

The educational consequences of the Christchurch earthquake saw the state reviewing and temporarily amending the Education Act of 1989 with the new Canterbury Earthquake (Education Act) Order 2011. This new temporary act, made under the Canterbury and Recovery Act 2010, was approved on 10 March 2011 (see Appendix 1) and subsequently expired on 2 April 2012. This act modified the operation of the Education Act 1989 by providing access to schools with an enrolment zone, and to earthquake displaced families who were now living in-zone. Also, this temporary act made way for site-sharing of schools as the half-day now differed from the meaning it originally had in section 65(B)3 of the Education Act 1989.

State Intervention No. 2: School site-sharing agreements and re-location

The first visiting secondary school to commence site-sharing was Shirley Boys' High School on 7 March 2011. Its location in east Christchurch resulted in building and land damage with high levels of liquefaction (see Figure 19).



Figure 19: Shirley Boys' High School after the 22 February 2011 earthquake. [online image] [photo by Sarah Ivey, available from online article <http://www.nzherald.co.nz/education/news/article.cfm?c_id=35&objectid=10709205> [Accessed on 7 January 2013]

The host school was Papanui High School; the first mixed gender high school to be founded in north Christchurch. Both schools have a student composition of a similar socio-economic grouping of decile 6 rating (Table 5). Both schools reduced teaching hours with Papanui High School operating on site from 8am until 12.45pm and Shirley Boys' High School starting from 1pm until 5.30pm. Shirley Boys' had hoped to return to their school site at the beginning of Term 3 on 1 August 2011, but due to further land damage and liquefaction from the 13 June 2011 earthquake they returned on 9 September 2011. During the site-sharing agreement, re-locatable classrooms were built on the

Shirley Boys' High School original site and infrastructure below the ground was repaired. Normal schools hours then resumed for both schools.



Figure 20: Avonside Girls' High School main block prior to demolition. [online image]
Available from <<http://www.flickr.com/photos/hadevereux/6243070358/sizes/z/in/photostream/>>
[Accessed on 7 January 2013]

On 14 March 2011, Avonside Girls' High School commenced site sharing with Burnside High School for the rest of the year (Table 5). Avonside Girls' High School is located in east Christchurch alongside the Avon River and lateral spreading caused land cracking, liquefaction and building damage. The school's main two storeyed building (Figure 20) was demolished and pre-fabricated classrooms were built on site during 2011. Both schools reduced teaching hours with Burnside High School operating in the morning and Avonside Girls' High School in the afternoon from 1pm. As the school year progressed, the senior students of Burnside High School remained on site in the afternoon while Avonside Girls' High School occupied classrooms used by junior students of Burnside

High School. This was the longest site-sharing agreement during 2011 where schools had reduced teaching hours.



Figure 21: Cathedral of the Blessed Sacrament after the 22 February 2011 earthquake. The large 400-ton dome unstable and at risk of collapsing onto the adjacent school of Catholic Cathedral College. [online image] Photo by David Wethey/NZPA. Available from <<http://anglicantaonga.org.nz/News/Common-Life/Basilica-dome-has-to-come-down>> [Accessed on 7 January 2013]

Also on 14 March 2011, Catholic Cathedral College commenced site sharing with St Thomas of Canterbury College (Table 5). Catholic Cathedral College is situated in central Christchurch. Both colleges are state-integrated schools with Catholic Cathedral educating both genders while St Thomas' is an all-boys school. Catholic Cathedral College was founded in 1987 following the amalgamation of Sacred Heart College for girls, and Xavier College for boys. St Thomas of Canterbury College was founded in 1961. Again the host school operated in the morning and the visiting school in the afternoon. Site-sharing commenced due to a different reason than other site-

sharing agreements. There was no land or building damage but an unstable 400-ton dome of the Cathedral of the Blessed Sacrament which was adjacent to the school site (Figure 21). The dome was de-constructed and finally removed on 26 July 2011 and the school moved back on its own site on 1 August 2011 – the first day of Term 3 (Figure 22).



Figure 22: Dismantling of the dome off the Cathedral of the Blessed Sacrament in Barbadoes Street, Christchurch. Dome completely removed in July 2011. Containers in place for the prevention of falling masonry. [online image] Photo by BeckerFraser Photos. Available from <<http://www.facebook.com/CHCH.EQ.Photos>> [Accessed on 7 January 2013]

The third school to site share from the 14 March 2011 was the visiting school, Unlimited Paenga Tawhiti, with host school Halswell Residential College. Unlimited Paenga Tawhiti was located in the Central Business District of Christchurch and the building it occupied was damaged in the 22 February 2011 earthquake and subsequently demolished. Ten relocatable classrooms were moved onto the Halswell site and the residential capacity of Halswell was reduced to a maximum of 36 boys

(<http://www.halswellcollege.com/news/site-sharing-after-the-earthquakes>). No reduction in teaching hours occurred. Unlimited Paenga Tawhiti continued to share the campus of Halswell Residential College during 2012.



Figure 23: Marian College grounds after 22 February 2011 earthquake. [online image]. Available from < <http://www.chch.catholic.org.nz/?sid=2721> > [Accessed on 7 January 2013]

One week later on 21 March 2011, St Bede's College for boys became the host school for Marian College for girls. Both are Catholic state-integrated schools and the site sharing agreement remained in place until the end of the school year in December 2011 (Table 5). Marian College was founded in 1982 with the merging of two Catholic secondary schools for girls, St Mary's College and McKillop College. Marian College is located in east Christchurch and sustained major land and

building damage (Figure 23) and may not be rebuilt on the original site. Both schools operated with reduced teaching hours with St Bede's College commencing in the morning and Marian College from 1pm until 5.30pm. Marian College did not return to their original school site in 2012, instead they now occupy empty classrooms on the previous Xavier College site at Catholic Cathedral College. Relocatable classrooms were also built on site to accommodate the girls. Marian College is operating as their own entity within the grounds of Catholic Cathedral College and with a normal school day.

The last school to commence site-sharing was Linwood College with Cashmere High School. Teaching hours were reduced and the host school Cashmere operated in the morning, with Linwood operating from 1pm until 5.30pm in the afternoon (Table 5). This site-sharing agreement was the shortest and Linwood College returned to their school site from the beginning of Term 3 on Monday 1 August 2011. During the site-sharing agreement buildings on the Linwood College site were demolished.

This section has only reviewed site sharing agreements between secondary schools in the Christchurch region. Site sharing agreements also occurred between primary and intermediate schools. No secondary school in the greater Christchurch region closed permanently during 2011 and 2012. The Ministry of Education is currently reviewing the future of all greater Christchurch schools (<http://shapingeducation.minedu.govt.nz>).

State Intervention No.3: Transportation of displaced students

During the site sharing agreements, students from visiting schools were transported to their host school on free buses supplied by the Ministry of Education. This was a massive organisational task as bus stops were located around the eastern half of Christchurch and Lyttelton to collect students. Many students had moved addresses due to house damage. The locations of these bus stops were reviewed regularly.

All visiting schools started at approximately 1pm and finished at around 5.30pm. One bus could transport students to different schools during the morning, but buses left each site sharing school at one time in the evening, approximately 10 minutes after school closed. A co-ordinator at each school was appointed to ensure all the buses had arrived and that all students were on their bus before the buses left. Figure 24 shows the location of the original schools in either central or east Christchurch and the location of the host school.

Table 6: The school roll of visiting 'site-sharing' secondary schools prior to the Canterbury 2010 earthquake. A total of 4,717 students were enrolled.

Visiting Secondary School	Enrolment Zone	Category	Date of ERO report	Decile	Roll
Avonside Girls' High School	YES	State	30-Sep-09	6	1218
Catholic Cathedral College	N	State-Integrated	9-Sep-09	3	342
Linwood College	N	State	5-Sep-08	2	913
Marian College	N	State-Integrated	16-Sep-09	7	450
Shirley Boys' High School	YES	State	28-Feb-08	6	1408
Unlimited Paenga Tawhiti	N	State-Integrated	28-Aug-09	6	386
				TOTAL	4717

Table 6 compiled from ERO reports 2008-2009. Available from<<http://www.ero.govt.nz>> [Accessed on 7 January 2013]

Figure 24: Location of damaged schools and host schools over 2006 Deprivation Index Map of Christchurch

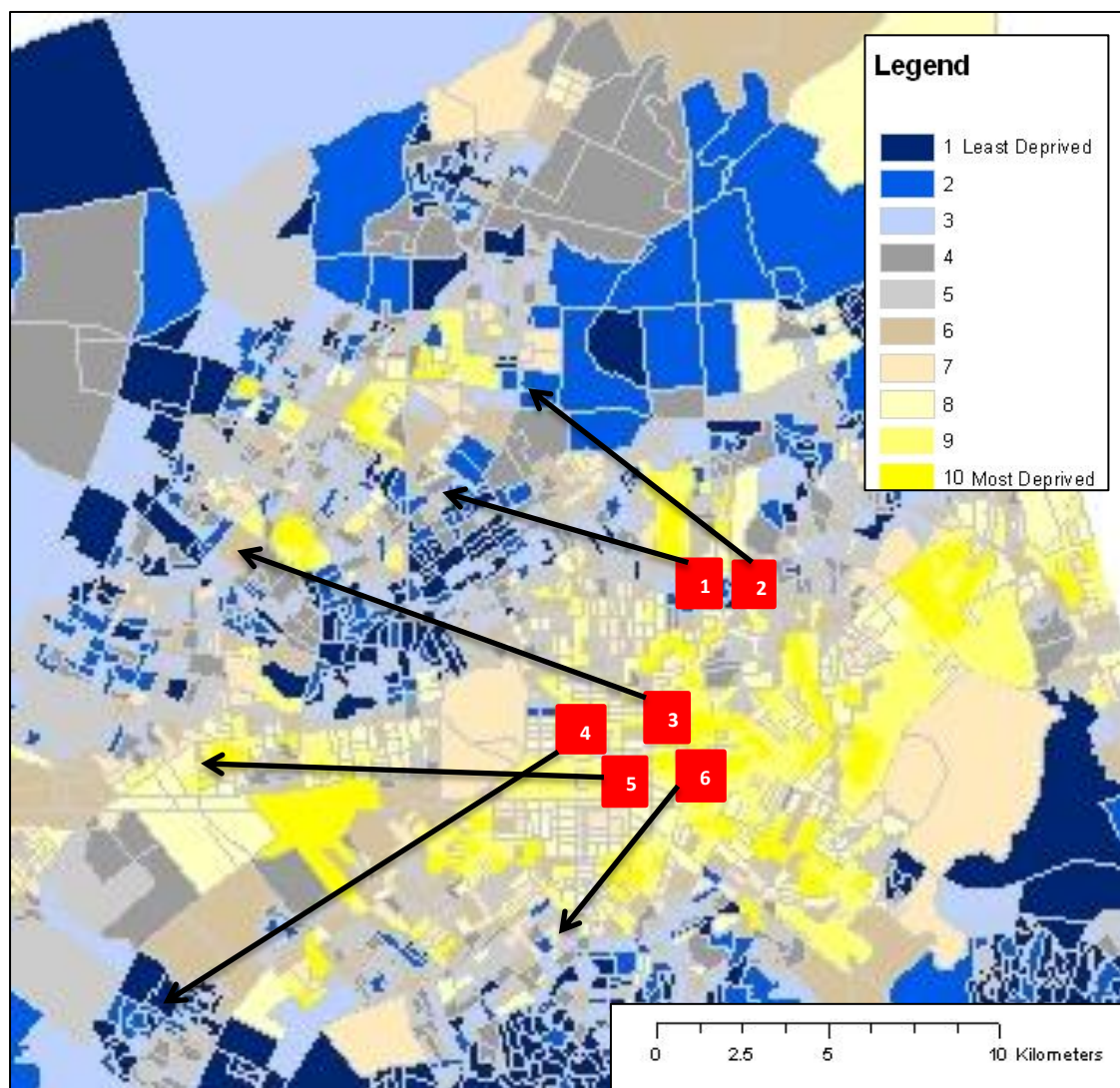


Figure 24: Map showing the approximate location of damaged schools. Red boxes indicate the location of their original school site while the arrows indicating the location of their new site sharing agreement. The legend indicates areas of high and low deprivation based on the latest Census data (2006) available. All damaged schools were located in the central and eastern areas of the city. The numbered red boxes represent the following schools and the name of their host school:

1. Shirley Boys' High School to Papanui High School
2. Marian College to St Bede's College
3. Avonside Girls' High School to Burnside High School
4. Unlimited Paenga Tawhiti to Halswell Residential School
5. Catholic Cathedral College to St Thomas of Canterbury College
6. Linwood College to Cashmere High School

The Educational Review Office (ERO) routinely inspects New Zealand schools and completes a report which is available online (www.ero.govt.nz). The school reports for the six visiting secondary schools, prior to the Christchurch Earthquake, provide the school roll. A total number of 4,717 students were enrolled when ERO last inspected the schools (Table 6) and although many families may have left the Christchurch region a significant transport arrangement was required to physically move the student composition of each school to their new displaced learning environment.

State Intervention No.4: Earthquake Impaired Derived Grades

Students in greater Christchurch schools had lost teaching and learning time during school closures and site-sharing agreements. The New Zealand Qualifications Authority (NZQA) recognised the circumstances faced by students attending greater Christchurch schools during 2011. NZQA administers the National Certificates of Educational Achievement (NCEA) for secondary school students and is responsible for the quality assurances of non-university tertiary training providers (www.nzqa.govt.nz).

Students enrolled in a greater Christchurch secondary school before the last day of Term 3 in 2011 were eligible to be covered by the provisions of the 'Earthquake Impaired Derived Grade' process (Appendix 11). Any student who enrolled in a school within greater Christchurch after the last day of Term 3 was ineligible. To be further eligible, a student had to be present at the examination session, and to have made an attempt to answer the paper by presenting standard-specific evidence. Unless both of these conditions were met, the student was not eligible to be considered for a derived grade for the standard(s). This did occur when a student left the bulk of a paper unanswered or whatever they wrote did not constitute a genuine attempt. (www.nzqa.govt.nz)

Greater Christchurch secondary schools then had to supply NZQA with grades derived from an assessment of a student against the registered criteria of the standard. Standard specific, valid and

authentic evidence for these grades was managed through school practice examinations, end of topic tests, and classwork. This was additional work for the school administrators. State interventions into the education of secondary school students supported students to achieve NCEA during a traumatic year.

4.8 Conclusion

The city of Christchurch is a coastal city, built on alluvial soils, drained wetlands and within a region of tectonic activity. Maori first inhabited the caves around the Port Hills about 1400 A.D. The Deans brothers were the first European settlers to arrive and established their home in Putaringamotu (Riccarton) in 1843. In 1847, a comprehensive plan encompassing the ideas of Edward Gibbon Wakefield was outlined by the Association for 'Founding the Settlement of Canterbury in New Zealand'. The Wakefield scheme of colonisation "was to found in a new land a settlement of representatives of the existing class society in England" (Morrison, p.3, 1948). Sales of the land within the original city plan were to be set aside to assist in the importation of labour. The middle class with ready capital to purchase land believed that the Church would not be neglected and there would be sufficient labour to begin trading or manufacturing on a small scale once they reached New Zealand's shores. They knew that plenty of miserable poor labourers in England would be willing to leave the homeland and adventure to the other side of the world. (Morrison, 1948)

The early European settlers experienced floods, tsunamis and earthquakes, but they did not abandon this location. The early growth of communities outside of the original city plan was not guided or planned. Working class communities populated suburbs to the south and east of the original city plan and industry grew. In 1903, Christchurch was the chief industrial centre of New Zealand.

The study of industrial growth in Christchurch in the first fifty years of colonisation, shows why certain industries were established in the city and its suburbs, why they are to be found in particular locations and what, if any, was their effect on the settlements of these districts, and on the subsequent growth of the city of Christchurch (Morrison, 1948). The progress in the establishment of local governments through Borough and District Councils gave residents political power and identity. The boundaries of each council unified the residents within them and segregated them residentially from other neighbouring districts.

Primary education was promoted for all children while the provision of secondary school education was socially selective, with early schools located near residential areas of high status. It was not the intention of the State to encourage children whose vocation is that of honest labour to waste in high schools where their time might be devoted to the learning of a trade (Campbell, 1941). Academic secondary schools were not built in working class suburbs and it was probable that working class children grew up never seeing an academic secondary school. Selective philosophies which motivated the provision of education resulted in locational inequalities which along with decile ratings and school enrolment zones contributed to the growth of residential segregation in Christchurch, which still exists today.

The Canterbury earthquakes of 2010 and 2011, have had an uneven geographical impact on the city. The Central Business District is located 10km inland. Residents living in low SES suburbs east of the CBD have been disproportionately affected. Coastal residential land sunk following the major earthquakes and the state has now designated large urban areas as unsuitable for re-building. Communities have changed and there has been a major disruption in the education of east Christchurch students. Six secondary schools were deemed unsafe due to land or building damage.

The education input of the student (the market) still existed but the school as a place needed to be relocated. The education input of the state intervened in four ways; through amending the Education Act of 1989, by arranging site sharing agreements with secondary schools in 'safer' parts of the city, providing student's with free transport to the new host school, and enabling students to apply for 'earthquake impaired derived grades'. The results of these interventions are the content of Chapter 6.

The disproportionate effects of the Canterbury earthquakes on east Christchurch communities can be viewed through an environmental justice perspective. As in the early 20th century with the lack of forethought in not governing the spread of communities outside of the original city plan, the neoliberal policies of the 1980s, enabled the draining of coastal wetlands for developed into residential housing. There was plenty of land available in other parts of the city. But cheap land that was once nearby a coastal city dump or a wetland would provide a rateable value and financial returns for both the local government and the land developer. The land values were low and attracted low SES groups.

Prior to 2010, the eastern communities of Christchurch were statistically poorer than those in the west of Christchurch (refer to Figure 17). The gap between east and west may have widened since these major natural disasters occurred. Inequalities in the educational achievement of all Christchurch secondary schools may occur due to the disruption caused by these natural events. Results, in Chapter 6, will show whether state interventions have assisted secondary schools, their teachers and their students to overcome the impacts of the Canterbury earthquakes.

Chapter 5 Research Methodology

5.1 Introduction

This chapter details the methods and processes used to acquire and analyse the information in the research of this thesis. Research has been undertaken at both the general (macro) and specific (micro) levels. At the general macro level, research includes the education performance of all greater Christchurch secondary schools before and after the major earthquakes, namely 2009 – 2012, and results are analysed in Chapter 6. While at the micro level, research was undertaken at one Christchurch secondary school that was displaced due to the Christchurch earthquake of 22 February 2011. The results of this research are analysed in Chapter 7.

The micro level research surveyed one school community: secondary schools students, parents and caregivers, teachers and staff, on the impacts of Canterbury earthquakes and aftershocks. This secondary school entered into a site-sharing agreement where teaching times were reduced and school opening hours were in the afternoon. This research required human ethics approval from the University of Canterbury and the process is detailed later in this chapter. Due to the guidelines from the University of Canterbury Human Ethics Committee, the name of the secondary school researched along with the education performance results cannot be mentioned in this methodology chapter or in the specific results (Chapter 7). The limitations that occurred due to the conditions set by the University of Canterbury Human Ethics Committee are also detailed later in this chapter.

The impacts of Canterbury earthquakes and aftershocks on secondary school students would vary at the individual level depending on the changes to their home and school environment. Prior to 2010, there was an existing division between east and west Christchurch in terms of social class,

deprivation and land values. Following the earthquakes and aftershocks, large areas of residential housing and land in east Christchurch have been damaged and will not be re-developed in the near future. The State has intervened and purchased damaged land from home owners. I hypothesise that existing educational inequalities have widened as a result of these natural urban disasters due to schools and students in the eastern parts of the city having been disproportionately affected.

The aim of this chapter is to detail the methodologies used to examine the hypothesis through the following thesis objectives:

1. To analyse the effects of the Canterbury earthquakes (4 September 2010, 22 February 2011, 13 June 2011) on existing educational inequalities between Christchurch secondary schools.
2. To examine the impacts of the earthquakes on a sample school community who were displaced (to another school) because of the Christchurch earthquake of 22 February 2011.
3. To record and evaluate state interventions into secondary school education in the greater Christchurch region during 2011.

5.2 Data sources

The data sources required to illustrate the existing inequalities in education outputs between secondary schools will be each school's decile ratings and education performance results in national examinations. The independent variable will be decile ratings which are calculated from the latest census and the dependent variable will be the National Certificate in Educational Achievement results at the school level. Both variables are described later in this chapter.

The effects of the earthquakes on existing education inequalities will be analysed through the independent and dependent variables mentioned above, but changes to the school and home

environment will also be analysed. Schools that entered into site sharing agreements, also had reduced teaching times and a change of school hours, so the education outputs of site-sharing schools can be compared between schools and with all secondary schools in greater Christchurch region.

Research into the effects of the earthquakes and aftershocks on the sample school community will be conducted through hand written responses on paper questionnaires. The human ethics process and questionnaire design are detailed later in this chapter. Analysis of results will be determined once the questionnaire process is completed. The decile rating and the education performance of this school cannot be included in the results due to the conditions set by the University of Canterbury Human Ethics Committee.

The State's interventions into the education of children and young adults in the greater-Christchurch region are increasing since this thesis proposal was first approved. All interventions during 2011 will be recorded in the context chapter of this thesis (Chapter 4) and the results of the interventions will be analysed in Chapter 6.

5.3 Objective 1: To analyse the effects of the Canterbury earthquakes on existing educational inequalities between Christchurch secondary schools.

Greater Christchurch secondary schools include all secondary schools within the region affected by the Canterbury earthquake of 4 September 2010 and the devastating aftershock, often referred to in this thesis as the Christchurch earthquake of 22 February 2011. The region includes the Christchurch City Council, Selwyn District Council, and the Waimakariri District Council. This region has an estimated population of 457,400 residents and a land area (not including inland waters or oceanic

areas) of 10,137km² (www.localcouncils.govt.nz). This region is also specified as the 'community' in the State's renewal and redevelopment of the educational needs of children and young people following the Christchurch earthquake (www.shapingeducation.minedu.govt.nz).

This macro level approach to examining the education outputs of greater Christchurch schools commenced in the previous chapter with the history of education provision in the region. Essentially, the 'student' created the market for new secondary schools. Residential segregation was established early in the settlement of the city of Christchurch, as secondary schools were located near the University of Canterbury. Residential segregation has continued due to school enrolment schemes and neoliberal education reforms.

Independent variable: decile ratings

In 1996 all schools were ranked by deciles with additional funding to lower decile schools. Decile ratings were recalculated in 2001 and 2006 once the census data was released. A school's decile indicates the extent to which it draws its students from low socio-economic areas. Decile 1 schools are the 10% of schools with the highest proportion from low socio-economic areas. Census information is used to calculate the decile. "A school provides its student addresses and these are used to determine which areas its students come from (www.minedu.govt.nz)". Therefore, it is not the general area around the school that is used to calculate the decile, but the census meshblocks (each containing 60-70 households) where students live. (www.minedu.govt.nz)

The five factors that make up the socio-economic indicator for deciles are:

1. Household income
2. Occupation
3. Household crowding

4. Educational qualifications
5. Income support

Census information is used to calculate these factors for each meshblock. The Ministry of Education accesses meshblock data from the Department of Statistics. Schools are ranked in relation to every other school nationally for each of the five factors and receive a score according to the percentile that they fall into. The Ministry of Education places schools into ten groups called deciles, each having the same number of schools. (www.minedu.govt.nz)

Decile ratings for New Zealand schools are set once the latest census data is released. As at April 2013, the latest census data available is from the 2006 census. The 2011 census was cancelled due to the Christchurch earthquake on 22 February 2011, and the latest census was held on 5 March 2013. The current decile ratings reflect the 2006 socio economic data of the student's parents and the household they live in. There are no decile 1 secondary schools in the greater Christchurch region but this may alter after the latest census data is released. Schools labelled with a low decile rating may not reflect the current student population, due to changes between census dates, nor is the decile rating an indication of school quality or school resources. The Ministry of Education decile rating ranks decile 1 schools as the most disadvantaged socio-economic group, whereas the Statistics New Zealand Deprivation Index ranks '1' as the least deprived socio-economic group. The deprivation index ranking is a reversal of the school decile rating.

Research into low decile schools and governance found differences in governance related to school decile. The five factors that make up the socio-economic indicator for deciles indicate that other forms of disadvantage may also be occurring in the household and surrounding meshblock. Forty one per cent of high-decile school principals said their board had all the expertise needed while only

4 per cent of low-decile school principals said so (Wylie, 2007). Of the low-decile schools, thirty-one per cent of principals thought their board was coping or struggling compared with ten per cent of mid-decile school principals and six per cent of high-decile school principals (Wylie, 2007). Board experience and skill were also rated much lower by low-decile school principals and this could lead to governance failure (Wylie, 2007).

Dependent variable: National Certificate of Educational Achievement (NCEA)

The introduction of standardised testing enables the State to compare the overall achievement between students of the same year group and overall between schools of the same decile rating. Students sit Progressive Achievement Tests in Years 4 to 10. In Years 11, 12 and 13, students normally sit National Certificate of Educational Achievement (NCEA) in levels 1-3. In some secondary schools, however, able students may sit some NCEA papers in Year 10. A school's NCEA results are published in local newspapers and national magazines. Students and their teachers have access to an online website for individual or class results.

Publication of school examination results promote schools that contain students that are achieving towards the standard. Successful schools became popular schools filled with students that are achieving the national standards. The publication of school test results reveals the types of students attending the school rather than the quality of the school. Schools that contain failing students are targeted for intervention. Results are published so parental power in school choice is available, which is another facet of today's schools (Lipman, 2007).

The New Zealand Qualifications Authority (NZQA) was formed in 1989 and reports to the Minister of Education. NZQA's role in the secondary education sector is to ensure that New Zealand qualifications are regarded as credible and robust, nationally and internationally

(www.nzqa.govt.nz). NZQA is responsible for managing the New Zealand Qualifications Framework and administering the secondary school assessment system.

The National Certification of Educational Achievement (NCEA) is the main national qualification secondary school students are working towards in Years 11 to 13. NCEA is gained by building up credits and there are three different levels of NCEA. Credits are awarded for each standard a student achieves in the course they are studying. Assessments measure how well a student is meeting these standards. Internal assessments are completed during the school year while external assessments are an end of year exam or portfolio. Most Year 11 students start at level 1, and progress to level 2 in Year 12, and level 3 in Year 13. (www.nzqa.govt.nz)

The National Certificate of Educational Achievement (NCEA) was introduced as the main secondary schools qualification between 2002 and 2004. This replaced School Certificate, Sixth Form Certificate and University Bursary qualifications. NCEA Certificates are awarded at three levels and also recognise high achievement with subject and certificate endorsements. To gain entry to a New Zealand university, a student will need to have 42 credits at NCEA level 3 or above from a list of approved subjects as well as meeting literacy and numeracy requirements. Many universities and other tertiary providers in New Zealand also have specific course entry requirements. (www.nzqa.govt.nz)

Summary of Dependent and Independent Variables

The variables that have been selected for this macro level research have been chosen through a geographical perspective to illustrate the relationship between decile ratings and school achievement over four years. The first year of analysis is 2009, which represents the year before the first Canterbury earthquake and provides the base analysis for education performance across all greater Christchurch secondary schools. In 2010, the Canterbury earthquake affected students'

ability to study and learn towards NCEA achievement standards. State intervention into the education of Christchurch secondary school students during 2010 was limited to school closure to allow time for building inspections following the 4 September 2010. All Christchurch secondary schools re-opened in mid-September 2010. In 2011, the Christchurch earthquake caused school closure due to land and building damage. There were no earthquake impaired derived grades in 2010. The State then intervened into the education and performance outcomes of greater Christchurch secondary school students during 2011 through site-sharing agreements and the earthquake impaired derived grade process. The final year of analysis is 2012, when the highest recorded seismic event of the year was $M_w 5.48$ on 2 January 2012. Students were able to sit their NCEA internals and externals in 2012 without school closures due to seismic events. There was no direct state intervention into the education of Christchurch secondary school students during 2012. All NCEA results from 2009-2012 of the thirty-four secondary schools in the greater Christchurch region are tabled as Appendix 2.

The methods used to examine the patterns of change in education performance were correlation and regression analysis. These statistical methods focus on the relationship between the dependent variable (decile rating) and the independent variables (education achievement) and provide analysis data on how the value of the dependent variable changes when the independent variable varies. Correlation tests the statistical significance of the relationship, whereas regression analysis describes the relationship precisely by means of an equation that has predictive value. The coefficient of determination ranges from 0 to 1. An R^2 of 1.0 would indicate a perfect relationship between the two variables. These functions are available within Microsoft Excel software and are displayed on each graph through a linear trend line and analysis data.

5.4 Objective 2: To examine the impacts of the earthquakes on a sample school community who were displaced (to another school) because of the Christchurch earthquake of 22 February 2011.

One Christchurch secondary school will provide specific micro level research or primary data into the impacts of the earthquakes and aftershocks on individuals within a school community displaced due to earthquake damage. Discussions with the school's principal commenced in May 2011.

Questionnaire designs were researched during June and July 2011. Clarification regarding the questionnaire process was sought from the Chair of the University of Canterbury Human Ethics Committee on 19 August 2011.

5.4.1 Ethics approval

Advice was sought from the Chair of the University of Canterbury Human Ethics Committee, in August 2011, who was very clear on the methodological approach, as follows:

1. Participation is voluntary.
2. No incentives to be provided.
3. Three separate questionnaires to be prepared for the three groups: Students, Parents and Caregivers, Teachers and Staff.
4. Student questionnaire to be posted on school website so parents and caregivers could view before signing the consent form.
5. Each participant is to be provided with a 'Questionnaire Information Sheet' before they read their questionnaire.
6. No student can complete a questionnaire without written parent or caregiver consent on the form provided.

7. Once a student has written parental consent, they are then required to sign a student assent form agreeing that they have completed this questionnaire voluntarily acknowledging their answers will be included in the results of this research. Students can 'opt out' of the research even if their parents/caregivers have approved them as participants.
8. Each teacher, staff person, parent and caregiver is also required to complete a consent form agreeing that their participation is voluntary and their answers will be included in the results of this research.
9. The name of the school and the names of each participant will not be included in the methodology chapter or results chapter of the final thesis.
10. This research is to be treated confidentially as it is not anonymous.
11. All raw data to be stored securely within the Geography Department of the University of Canterbury and not on the school site.
12. Questionnaires and forms require written approval from the Board of Trustees of the secondary school being surveyed pending approval by the Human Ethics Committee.
13. Questionnaires and forms will not be distributed in the school community until approval is granted by both the Board of Trustees and the University of Canterbury Human Ethics Committee.
14. There are two Human Ethics Committees at the University of Canterbury. This research does not require Education Research approval as this thesis has a geographical perspective.
15. Post boxes to be set up in the school reception area for receiving completed questionnaires and forms.

Seven separate forms (Appendices 3-9) were designed and along with my application, were submitted to the University of Canterbury Human Ethics Committee (UCHEC) for comment and approval on 17 September 2011. My research proposal was considered and approved by the UCHEC on 28 September 2011 (HEC 2011/95, Appendix 10). The UCHEC also approved the results from the questionnaires to be included in my MSc. thesis. Approval was then sought and granted by the

Principal and the Board of Trustees of the same Christchurch secondary school, displaced by the earthquakes, to conduct a questionnaire that students, teachers and staff, and parents and caregivers can complete voluntarily. The process of this specific micro level research has been set out clearly by the University of Canterbury Human Ethics Committee.

5.4.2 Questionnaire

All participants were required to sign consent or assent forms before completing the questionnaire.

As the results of the questionnaires were to be included in this thesis, it was deemed necessary to conduct a methodical paper trail and not use technology to complete the questionnaire online. All completed questionnaires have consent or assent forms to show the process set by the University of Canterbury Human Ethics Committee has been followed.

There are three separate questionnaires, one for each group: students, teachers and staff, and parents and caregivers (Appendices 4-6). An information sheet was supplied to all participants to read before completing the questionnaire (Appendix 3). Each student participant required their parent or caregiver to read and sign a parent consent form, which was printed onto the Student's information sheet. Each student participant, with a signed parent consent form then signed a student assent form (Appendix 7). All adult participants signed a consent form (Appendices 8 and 9). In total seven separate forms were designed, each specific for their intended participant.

The questionnaire design was thoroughly researched to ensure a logical flow to the order of questions (De Vaus, 1991). No participant was required to write their name or address into the questionnaire. Each questionnaire began with an easy question inquiring about their previous earthquake experiences. Their answer was simply 'yes' or 'no' and this focused the participant into the theme and context of the questionnaire. Research into the correct number of Likert scale points

to use in the questionnaire were varied depending on the question and range of answers required (Dawes, 2008). Qualitative answers were also required, so open questions were included and lines available for qualitative answers.

The grouping of the questions took considerable preparation time. The range of possible answers needed to support the objectives of the thesis. The outline of Chapter 7 was prepared and then the methodology to assist in the research was backtracked to the preparation of the questionnaires.

Because the questionnaire directly asked the participants about their earthquake experiences, it was important that this questionnaire contained only relevant questions. Questionnaires were carefully prepared for each participant group. On site school guidance counsellors were informed of the questionnaire process and were available for students if required.

Pilot Questionnaire Sample

A modified student questionnaire was given to a class of Year 9 students, aged between 13 and 14 years of age, and one adult female Teacher Aide during class time in September 2011 to determine the following:

1. Time required to complete the questionnaire
2. Comprehension level of the youngest participants and their understanding of the wording contained in each question
3. Font size of the questions and paper size of the questionnaire.
4. To determine if the students felt the questions had a logical flow.
5. To determine if the questions were easy to understand and answer.
6. Feedback on how to improve the questionnaire in any way.

The pilot group were presented with two copies of the same questionnaire but on different sizes of paper. The pilot participants considered the double sided A3 size paper too long but the double sided A4 size paper was 'ok', although it contained the same questions, the only change was the font size. After the questionnaire was completed by the students, the wording of a few questions was changed before final submission to the Human Ethics Committee.

Distribution of the Questionnaires

Questionnaire information sheets were distributed to students during form time on 30 September 2011. The student questionnaire was posted on the school website so parents and caregivers could view before signing the consent form. Form teachers distributed student and parent/caregivers questionnaires. Teacher and Staff questionnaires were distributed through the school's internal mail system. Completed questionnaires and consent forms were inserted into 'post boxes' placed in the staff room and school reception area. Teachers were provided with blank student questionnaires and assent forms to give directly to their form class students once that student provided a parent consent form. Completed questionnaires and forms were received until the end of the school year on 9 December 2011.

Analysis of Questionnaire Data

The post boxes were emptied daily and completed questionnaires were categorised and responses typed into an excel spread-sheet for later analysis. Some participants were very open in their qualitative answers and provided descriptive experiences of the impacts of the earthquakes and aftershocks on their lives and those within their household, family, and community.

Once the completed questionnaires were being posted and the qualitative responses from this school community were being analysed, it was overwhelming to read the wealth of information being given voluntary, without incentives. People were taking time in their busy lives to write about

their experiences. Personally, there was a real value in completing this stage of my thesis. The earthquakes and aftershocks had most definitely impacted on this school community.

5.5 Objective 3: To record and evaluate state interventions into secondary school education in the greater Christchurch region during 2011.

Following the Christchurch Earthquake on 22 February 2011, schools were closed. The earthquake had damaged school buildings and land throughout the city, especially in east Christchurch. State interventions into the secondary education sector of the region are listed below:

1. The State reviewed and temporarily amended the Education Act of 1989 with the new Canterbury Earthquake (Education Act) Order 2011. This new temporary act was approved on 10 March 2011, expired on 2 April 2012 and was made under the Canterbury Earthquake and Recovery Act 2010. This act is filed as Appendix 1. This act modified the operation of the Education Act 1989 by providing access to schools with an enrolment zone, to earthquake displaced families who were now living in-zone. Also, this temporary act made way for site-sharing of schools as the half-day now differed from the meaning it originally had in section 65(B)3 of the Education Act 1989.
2. Six secondary schools were displaced due to building and land damage from the Christchurch earthquake of 22 February 2011 and then became 'visitor schools' to 'host schools' in safer parts of Christchurch.
3. During the site sharing agreements, students from visiting schools were transported to this host school on free buses supplied by the Ministry of Education.
4. The New Zealand Qualifications Authority (NZQA) recognised the circumstances faced by students attending greater Christchurch secondary schools and provided students with

eligibility of a 'Earthquake Impaired Derived Grade' for their 2011 National Certificate in Educational Achievement (Appendix 11)

The State's interventions into education will be evaluated through the NCEA 2011 educational achievement of Christchurch secondary schools. NCEA 2011 results will be compared with NCEA results from 2009, 2010, and 2012.

5.6 Limitations of the research methodology

The major limitation of my research was the approval process of my research by the University of Canterbury Human Ethics Committee. This process limited the amount of participants. Initially, I did have plans to survey the entire student population, and later conduct focus groups and interviews. Also, I was not able to compare the questionnaire responses with individual NCEA achievement results due to the confidentiality of this research.

Another limitation of the research is my connection with my home city of Christchurch. If I had no connection to the place of research it may have been easier to collate the questionnaire responses more efficiently. However, every day I spent working on Chapter 6 either reading completed questionnaires or typing up the results was a day that I cried. I cried because I experienced this disaster and I cried because reading about my participants' experiences made me relive these events day after day, again and again. It took time to synthesise effectively the results for Chapter 6 as the responses were rich with qualitative responses. I have not been able to include all their responses into this thesis.

5.7 Conclusion

The scope of this methodology section has incorporated several different areas to research the objectives of this thesis. First, the thesis objectives are outlined and the approach to examine each objective is detailed. Second, the level of the research is both macro (general) and micro (specific). Macro level data provides general details of school achievement in national examinations over a four year period (2009-2012), while micro level data provides specific data during 2011 following the Christchurch earthquake through a school community questionnaire that required ethics approval from the University of Canterbury. Details of the approval process from the University of Canterbury Human Ethics Committee are listed, along with the questionnaire design. Third, the State's interventions during 2011 into the education of greater Christchurch secondary schools and secondary students that experienced the Christchurch earthquake of 22 February 2011 are listed. Finally, limitations to my research methodology are described.

Chapter 6: Impacts of the earthquakes and aftershocks on education and learning in greater Christchurch secondary schools

6.1 Introduction

The Canterbury earthquake and subsequent aftershocks altered the geography of greater Christchurch causing loss of life and disruption throughout the city and the surrounding districts of Selwyn and Waimakariri. Due to the magnitude of the earthquake and major aftershocks, many buildings in the region sustained damage. All schools were closed until buildings and infrastructure was inspected. Some schools remained closed for a significant time due to land damage and structural damage of school buildings. Demolition of many school buildings needed to be completed before the school could operate on site again.

The aim of this chapter is to analyse education performance of greater Christchurch secondary schools through examining each school's National Certificate of Educational Achievement (NCEA) results levels 1-3 from 2009 until 2012 (tabled as Appendix 2). This thesis hypothesises that existing educational inequalities in Christchurch have widened as a result of the Canterbury earthquakes of 2010 and 2011 due to schools and students in eastern parts of the city having been disproportionately affected.

In order to examine this hypothesis, once the secondary schools are introduced, this chapter is then organised into four sections:

1. What differences existed in educational performance of Christchurch secondary schools prior to the Canterbury 2010 earthquake?

2. What impacts did the Canterbury earthquake of September 2010 have upon the subsequent pattern of educational achievement of greater Christchurch secondary schools?
3. To what extent did state interventions following the Christchurch earthquake of February 2011 affect patterns of educational performance between greater Christchurch secondary schools? Did the state intervention of site sharing of secondary schools affect educational performance?
4. Did educational inequalities widen between greater Christchurch secondary schools as a result of the 2010 and 2011 earthquakes?

Finally, for 2011 and 2012, the education performance of greater Christchurch secondary schools will be compared with the average NCEA levels 1-3 results from Canterbury and New Zealand.

6.2 Greater Christchurch secondary schools

This chapter will focus on thirty four Independent, state and state-integrated secondary schools in the greater Christchurch region listed in Table 7. The NCEA results from 2009 until 2012 are listed as Appendix 2. There are other secondary schools within the region that are not listed due to the following reasons:

1. The secondary school only operates as a middle school and teaches students up to and including Year 10, and no students sit NCEA, for example, Hillview Christian College.
2. The school's national examination results have not been published in 'The Press' newspaper every year since 2009, for example, Te Kura Kaupapa Maori o Waitaha school.
3. The students do not sit NCEA level 1 examinations, for example, Rudolf Steiner School.
4. They are schools for different learners, for example, Residential Colleges, Van Asch Deaf Education Centre and Southern Regional Health School.

Twelve secondary schools in greater Christchurch have a school enrolment zone (refer to Table 7). Schools in the Christchurch City Council region, with school enrolment zones within the region, are state schools with either a high decile or single gender education. Schools in the adjacent district councils of Waimakariri and Selwyn have enrolment zones that cover a large rural area within the district defining locations for school enrolment. Schools, with enrolment zones, that have spaces available for new students; have a yearly ballot where out-of-zone enrolments have the opportunity of a placement at this school.

The education performance of greater Christchurch secondary schools is shown in Appendix 2 and analysed throughout the rest of this chapter. The first year of statistical analysis is 2009: the year before the first Canterbury earthquake on 4 September 2010. This is the baseline year for this research and analysis. Educational inequalities and unequal student outcomes already existed in 2009 and these will be further analysed and compared with NCEA results from the years 2010, 2011 and 2012 in the following sections of this chapter.

Geographically, east Christchurch secondary schools have a lower decile rating and lower levels of school achievement than secondary schools in central or west Christchurch. There are no decile one secondary schools in the greater Christchurch region. Aranui High School and Linwood College are both decile two rated schools with NCEA level 1 results ranging between 38.0% and 70.5%. While four decile 10 rated schools; Christ's College, Rangi Ruru College, St Andrew's College, and St Margaret's College have achievement results ranging between 95.3% and 100% for NCEA level 1. The following section will examine what differences existed in educational performance of Christchurch secondary schools prior to the Canterbury earthquake in September 2010.

Table 7: Thirty four secondary schools in the greater Christchurch region

	School	District	Enrolment Zone*	Category	Decile
1	Akaroa Area School	Christchurch	N	State	8
2	Aranui High School	Christchurch	N	State	2
3	Avonside Girls' High School	Christchurch	Yes	State	6
4	Burnside High School	Christchurch	Yes	State	8
5	Cashmere High School	Christchurch	Yes	State	8
6	Catholic Cathedral College	Christchurch	N	State-Integrated	3
7	Christ's College	Christchurch	N	Independent	10
8	Christchurch Adventist School	Christchurch	N	State-Integrated	6
9	Christchurch Boys' High School	Christchurch	Yes	State	9
10	Christchurch Girls' High School	Christchurch	Yes	State	9
11	Darfield High School	Selwyn	Yes	State	8
12	Ellesmere College	Selwyn	N	State	8
13	Hagley Community College	Christchurch	N	State	5
14	Hillmorton High School	Christchurch	N	State	5
15	Hornby High School	Christchurch	N	State	3
16	Kaiapoi High School	Waimakariri	Yes	State	5
17	Lincoln High School	Selwyn	Yes	State	9
18	Linwood College	Christchurch	N	State	2
19	Mairehau High School	Christchurch	N	State	4
20	Marian College	Christchurch	N	State-Integrated	7
21	Middleton Grange	Christchurch	N	State-Integrated	9
22	Oxford Area School	Waimakariri	N	State	7
23	Papanui High School	Christchurch	Yes	State	6
24	Rangi Ruru Girls' College	Christchurch	N	Independent	10
25	Rangiora High School	Waimakariri	Yes	State	8
26	Rangiora New Life	Waimakariri	N	State-Integrated	8
27	Riccarton High School	Christchurch	Yes	State	7
28	St Bede's College	Christchurch	N	State-Integrated	9
29	St Thomas of Canterbury College	Christchurch	N	State-Integrated	8
30	Shirley Boys' High School	Christchurch	Yes	State	6
31	St Andrew's College	Christchurch	N	Independent	10
32	St Margaret's College	Christchurch	N	Independent	10
33	Unlimited Paenga Tawhiti	Christchurch	N	State-Integrated	6
34	Villa Maria College	Christchurch	N	State-Integrated	9

* school enrolment zone within the greater Christchurch region. Some State-Integrated Schools have school enrolment zones that extend out of the region. 147

6.3 What differences existed in educational performance of Christchurch secondary schools prior to the Canterbury earthquake in September 2010?

Each year secondary school students sit NCEA national examinations, and in line with neoliberal education reforms, the results are published in daily newspapers and magazines. Involved parents and caregivers are able to evaluate each school and have knowledge of what schools contain students that are achieving the National Certificate in Educational Achievement in levels 1 to 3.

The first year of our statistical analysis is 2009: the year before the Canterbury earthquake on 4 September 2010. This year was chosen as the micro level research results, detailed in Chapter 7, show a majority of secondary school students had not experienced an earthquake prior to 2010. All secondary schools from Table 7 have published results from 2009 shown in Appendix 2. Regression analysis will test whether there is a predictive relationship between the independent and dependent variable. The independent variable is decile rating and the dependent variable is the percentage of a school's overall achievement or education output across the three NCEA levels for 2009. The analysis will indicate if the proportion of variation in the dependent variable can be explained by the independent variable.

NCEA level 1 results from 2009 (Figure 25) show there is a positive relationship between decile ratings and achievement. The coefficient of determination (R^2) of 0.5268 indicates that over half the variance in NCEA achievement is explained by a school's decile rating. The results provide an indication that a school's overall achievement in NCEA level 1 may be due to the school's student composition. The associated regression coefficient of 4.97 indicates that for each increase in one decile, NCEA performance increased by 4.97%. One decile two school had more than 60% of their Year 11 students, aged between 15 and 17 years of age, failing this national examination. The scatter

patterns show within each decile rating there is a range of school results with four state or state-integrated schools in the decile 7-9 range sharing similar overall school results as the four independent (private) decile 10 schools, the latter results overlap on the graph.

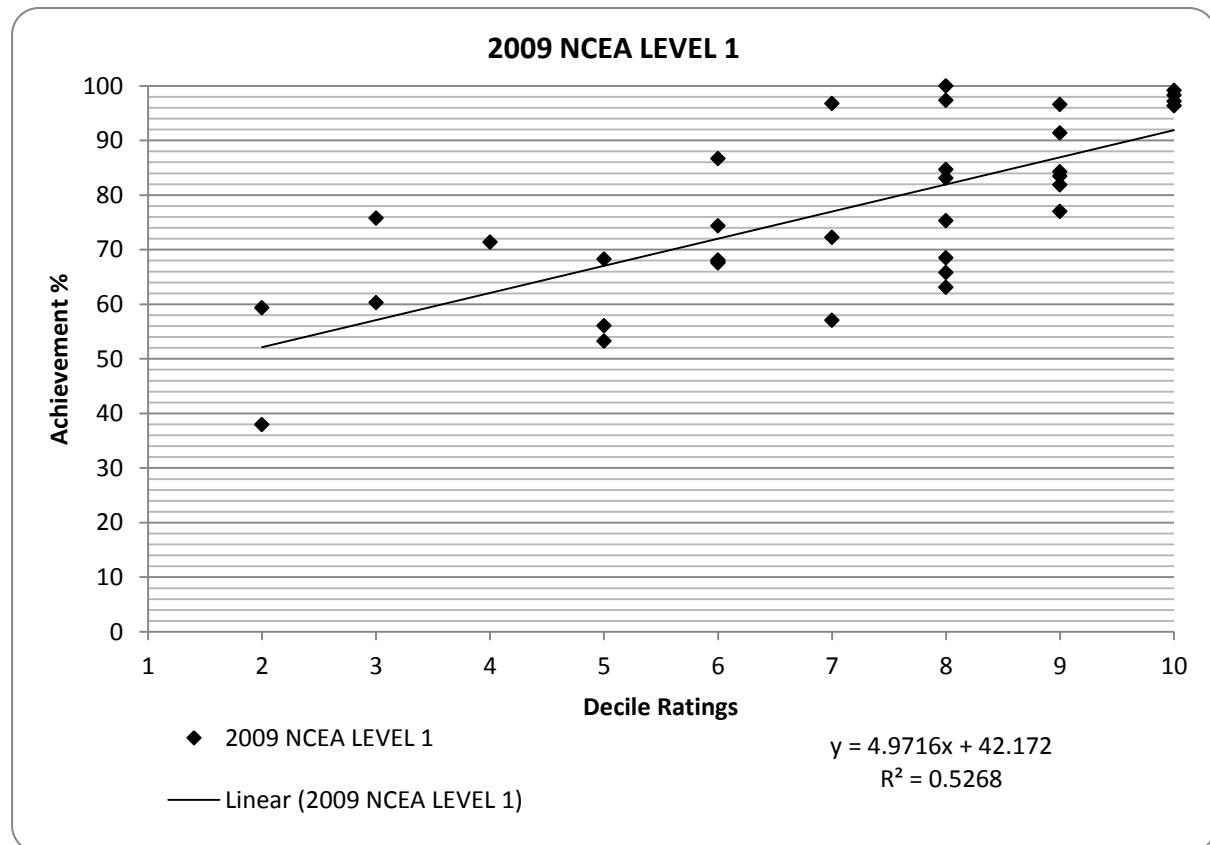


Figure 25: 2009 NCEA level 1 results.

NCEA level 2 results from 2009 (Figure 26) show a stronger positive relationship between decile ratings and achievement. The coefficient of determination (R^2) of 0.7159 indicates that over two-thirds of the variance in NCEA achievement is explained by a school's decile rating. The associated regression coefficient of 5.22 indicates that for each increase in one decile, NCEA performance increased by 5.22%. Students attaining credits for this national examination are now over the legal

school leaving age of 16 years. Also, a student's NCEA level 2 results in 2009 were required for University applications during 2010 for enrolment in 2011. Students that do not achieve NCEA level 2 during Year 12 can continue to achieve level 2 credits during Year 13. Again, the scatter patterns show that four independent schools, all rated decile 10, have similar results when graphed and are grouped together, but there is strong competition from four other state or state-integrated schools in the greater Christchurch region.

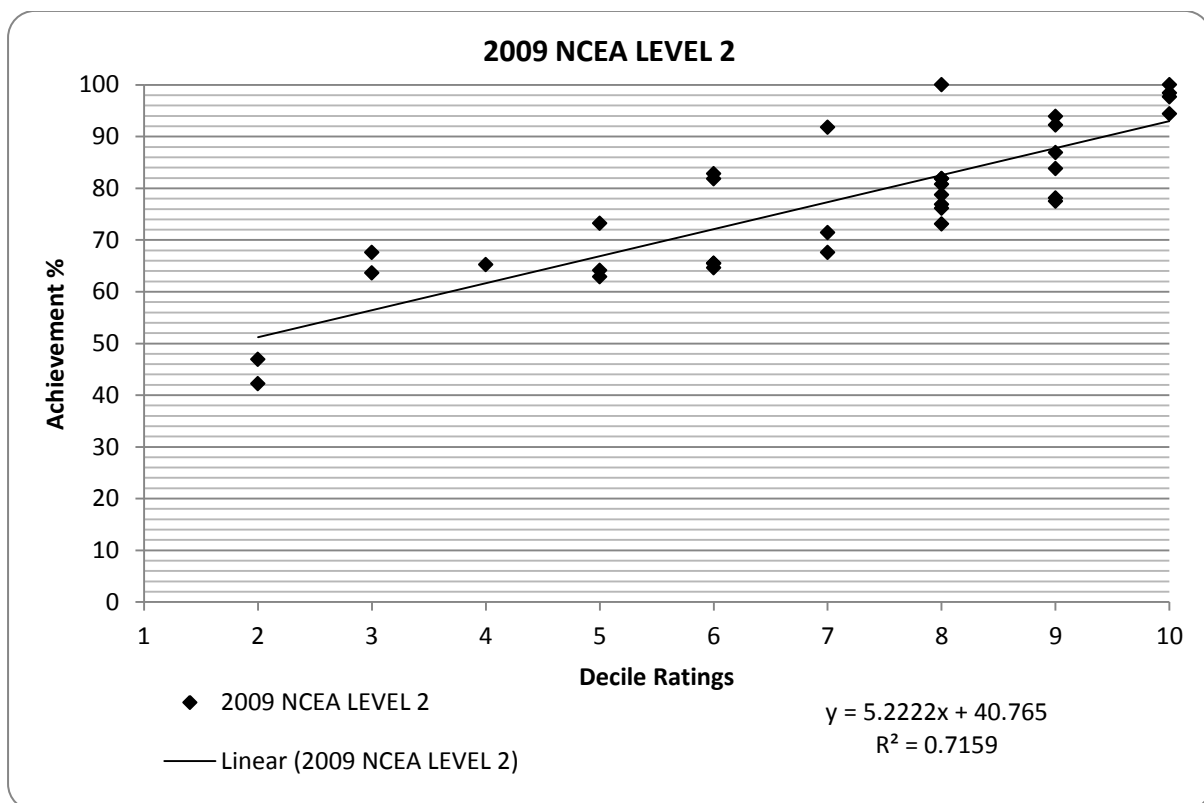


Figure 26: 2009 NCEA level 2 results

NCEA level 3 results in 2009 (Figure 27) show a weak but positive relationship between the school decile and achievement levels. The coefficient of determination (R^2) of 0.3249 indicates that almost one third of the variance in NCEA achievement is explained by a school's decile rating. The

associated regression coefficient of 4.45 indicates that for each increase in one decile, the NCEA performance increased by 4.45%. The relationship is weaker than NCEA levels 1 and 2, but still an indication of the overall education performance of greater Christchurch schools. The scattering of each school's performance illustrates the strong academic focus of the four decile 10 independent schools, which all achieved the highest results. The outliers of one high performing decile three school and the low performing decile two schools weaken the analysis of this relationship.

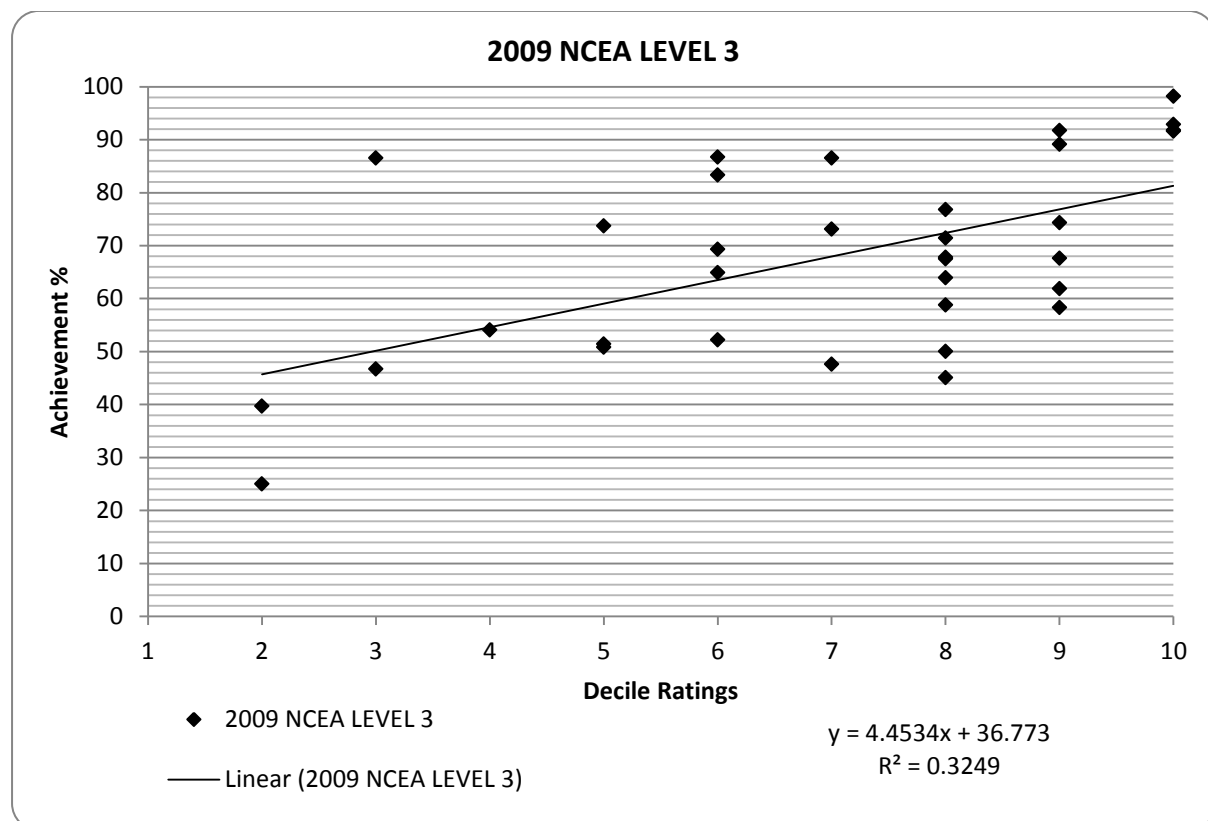


Figure 27: 2009 NCEA level 3 results

In summary, the aim of this section was to establish if differences in education performance between Christchurch secondary schools existed prior to the Canterbury earthquake in 2010. To find what differences existed, thirty four secondary schools were grouped by their decile rating (X

axis = independent variable) and plotted against their school's NCEA achievement results (Y axis = dependent variable). Regression analysis found a predictive relationship between variables indicating that differences in a school's NCEA achievement could be 'explained' by a school's decile rating.

Our results indicate education inequalities existed in greater Christchurch secondary schools in 2009, the year before the first Canterbury earthquake. In 2009, secondary school students from all over the region had enrolled but failed in achieving the National Certificate of Achievement. As discussed in Chapter 2, traditional studies into unequal student outcomes have focussed on the student's family background, social class, ethnicity, and school resources as reasons for differences in student outcomes. Regression analysis does not provide a causal effect for the significance in the relationship between decile rating and school achievement. But, recent geographical perspectives focus on the place and school effects within schools, of low and high achievement, to explain the differences that exist in educational performance.

When the first earthquake struck on 4 September 2010, many students were studying towards internal credits in NCEA. Levels of anxiety and fear increased over the next months while students were preparing for their external NCEA examinations which were held in November 2010. The next section will now analyse what impacts the 2010 earthquakes had on existing patterns of educational performance.

6.4 What impacts did the September 2010 Canterbury earthquake have upon the subsequent patterns of educational achievement?

Using 2009 as the baseline year, the 2010 NCEA school results are plotted as a percentage of change.

In Table 7, for example, the first school on the list is Akaroa Area School. This decile 8 school achieved 100% in NCEA level 1 in 2009 and 83.3% in NCEA level 1 in 2010 (refer to Appendix 2).

Therefore, the change is a decrease of 16.7%. The increase or decrease of change in 2010 results from the previous year has been calculated for all secondary schools and once plotted (y = dependent variable of NCEA as a percentage of change, x = independent variable of decile rating) lower decile schools generally have the largest drops in achievement across all NCEA levels.

Regression analysis shows a weak but positive relationship against all three levels of NCEA indicating that higher decile or more affluent schools were less likely to suffer drops in achievement levels (refer to Figures 28, 29, and 30).

The 2010 NCEA level 1 results, as a percentage of change, are shown as a graph in Figure 28. The results show a weak coefficient of determination of 0.1447. The associated regression coefficient of 1.7 indicates that for each increase in one decile, NCEA performance increased by 1.7%. The significant aspect of this graph is that, with one exception (a decile 2 school with 11.5% increase), the lower decile schools, containing students from lower SES families, all had the highest NCEA level 1 declines.

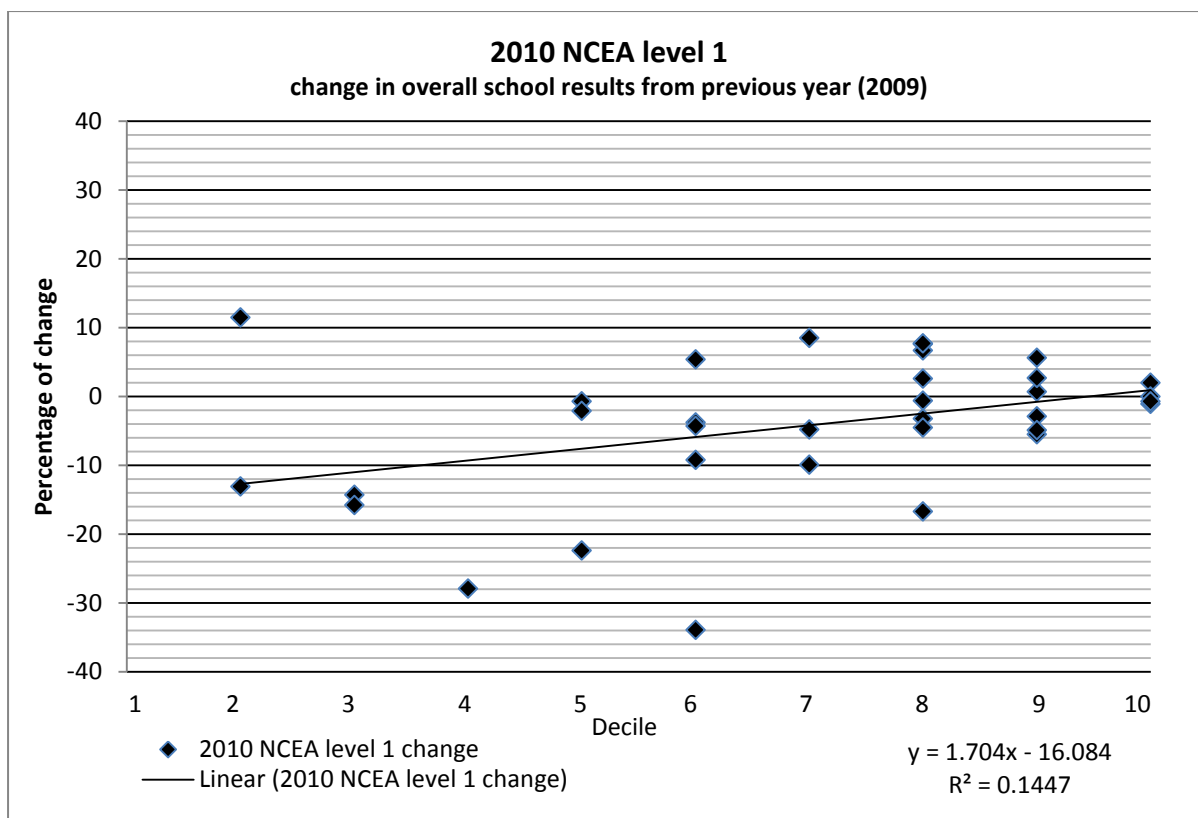


Figure 28: 2010 NCEA level 1 results as a percentage of change from 2009.

Year 12 is a significant year for students in New Zealand. Level 2 NCEA results are included in university enrolments and applications for university campus accommodation. The 2010 NCEA level 2 results, as a percentage of change, are shown as a graph in Figure 29. As with the 2010 NCEA level 1 results, the level 2 results show a weak coefficient of determination (R^2) of 0.0402. The associated regression coefficient of 0.86 indicates that for each increase in one decile, the NCEA performance, as a percentage of change, increased positively by 0.86%. The significant aspect of this graph is the linear analysis is contained within the negative region of change indicating an overall decrease in results across all deciles from the previous year (2009).

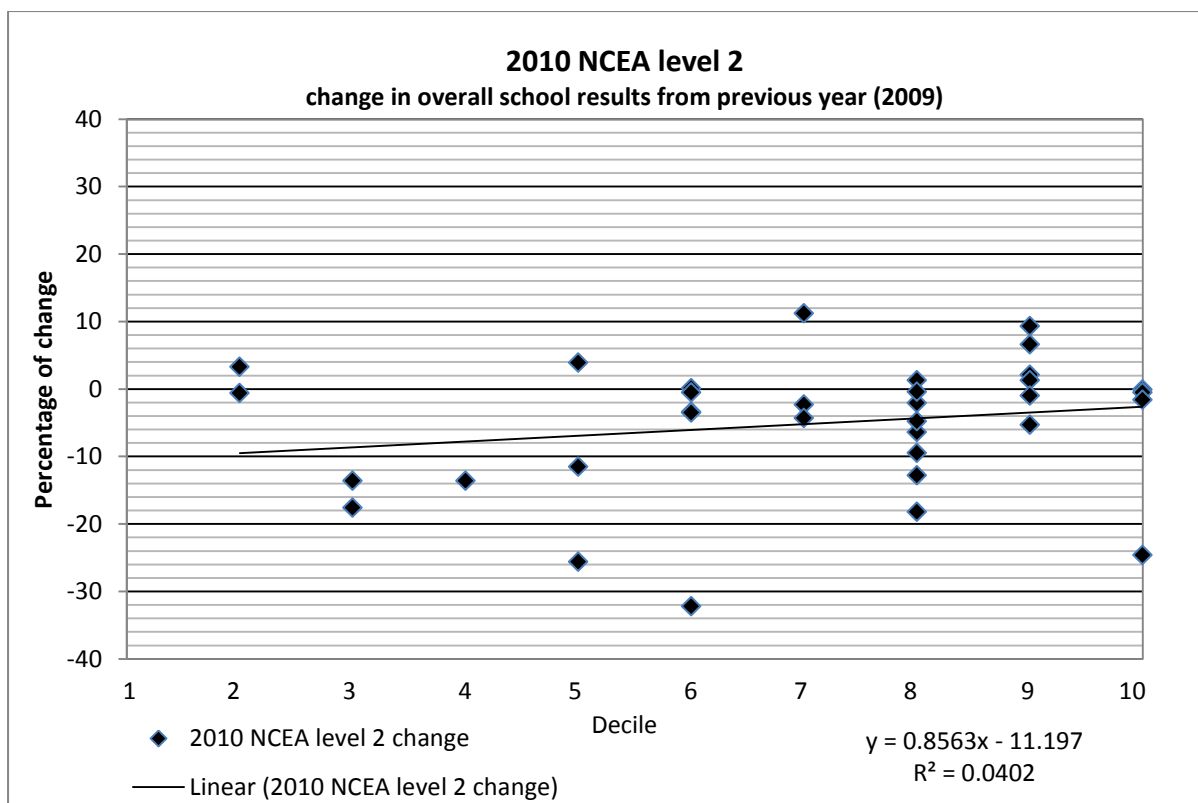


Figure 29: 2010 NCEA level 2 results as a percentage of change from 2009.

During Year 13, students complete NCEA level 3 credits towards achieving NCEA level 3 and University Entrance. The 2010 NCEA level 3 results, as a percentage of change, are shown as a graph in Figure 30. Again, the results show a weak R^2 of 0.1341. The associated regression coefficient of 2.43 indicates for each increase in one decile, the NCEA performance, as a percentage of change, increased positively by 2.43%. As with 2010 NCEA level 2 results, the linear trend analysis is contained within the negative region of change indicating an overall decrease in results across all deciles from the previous year. The significant aspect of this graph is the lower decile schools all had declines as did the four independent private decile ten schools. In some Christchurch secondary schools, students that did not achieve NCEA level 3 or University Entrance were able to enrol as Year 14 students to complete their secondary school education and then enrol mid-year in a University or other Tertiary institution.

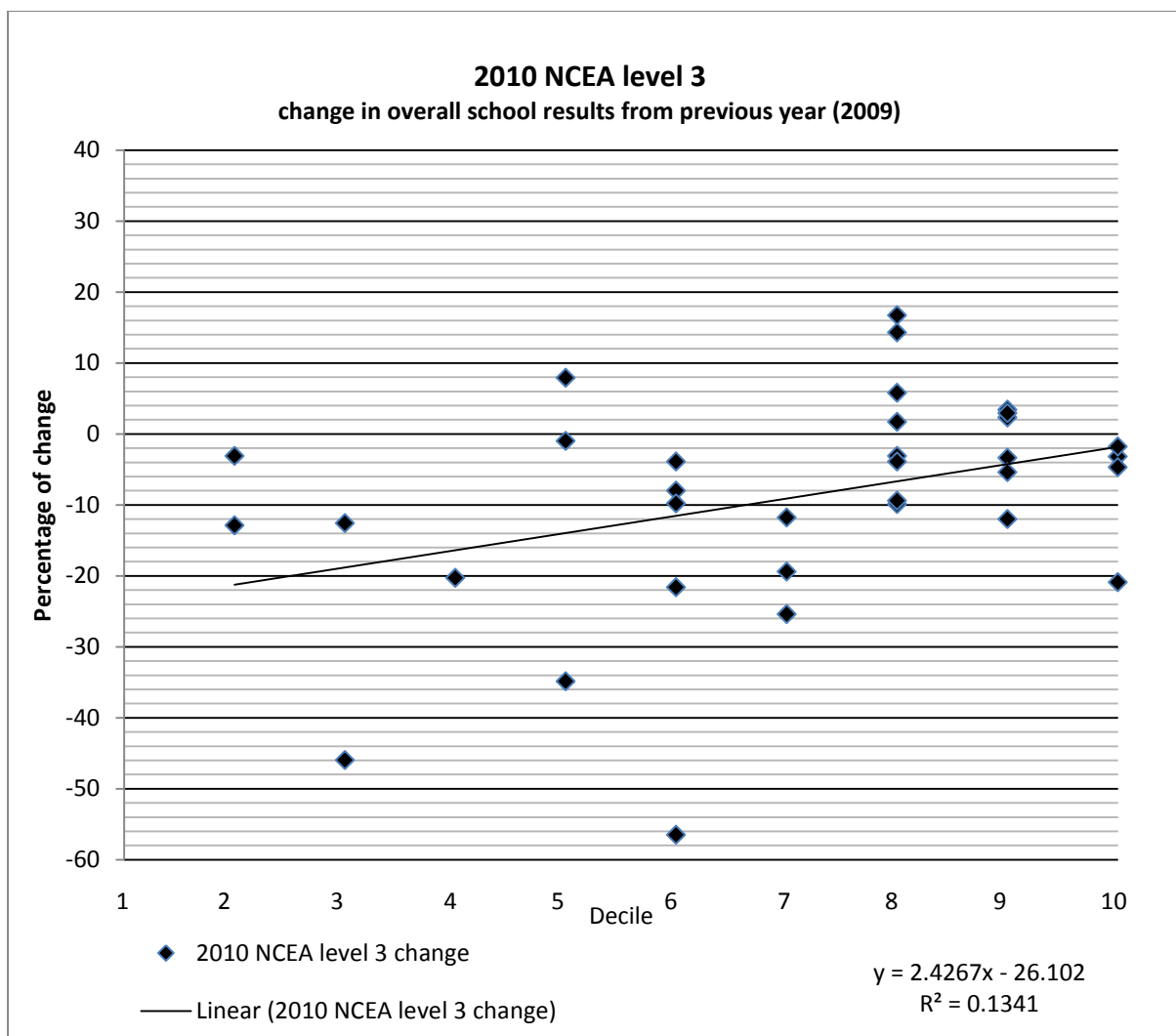


Figure 30: 2010 NCEA level 3 results as a percentage of change from 2009

The NCEA levels 1-3 results, from each secondary school, as a percentage of change from the previous year were then combined under decile rating and this data is summarised in Table 8. There are no decile 1 secondary schools in greater Christchurch. The data was summarised in Excel and the 'minimum' and 'maximum' state the range of data. There are no outliers. The average negative change in results of all secondary schools within one decile, indicate an overall lower achievement when compared to the previous year.

Table 8: 2010 NCEA levels 1-3 cumulative results as a percentage of change from the previous year (2009)

	SCHOOL DECILE									
	1	2	3	4	5	6	7	8	9	10
Average	0.00	-2.5	-20.0	-20.6	-9.6	-12.3	-6.5	-1.7	-0.2	-4.8
Median	0.00	-1.9	-15.1	-20.3	-2.1	-4.3	-4.8	-2.6	1.0	-1.3
Minimum	0.00	-13.1	-46.0	-27.9	-34.9	-56.5	-25.4	-18.2	-12.0	-24.6
Maximum	0.00	11.5	-12.6	-13.6	7.9	5.4	11.2	16.7	9.3	2.0

Results for 2010 indicate that fewer students in the greater Christchurch region were achieving the national examinations compared to the previous year. This can be seen from Table 8 where schools with decile ratings of 3-4 witnessed the largest average drops in achievement levels. Fewer students had the qualifications enabling entry to tertiary institutions. This can be explained, in many situations, due to the impacts of the Canterbury earthquake and less teaching hours due to school closure. Many Christchurch students and their families were now living in damaged homes with uncertainty about insurance claims. Students, along with their families and teachers, were now suffering anxiety due to the aftershock sequence. There was no state intervention into education enabling students to apply for earthquake impaired derived grades during 2010.

6.5 To what extent did state interventions following the February 2011

Christchurch earthquake affect patterns of educational performance in the greater Christchurch region?

Using 2009 as the baseline year again, the 2011 NCEA results as a percentage of change from the 2009 NCEA results are shown in Figures 31-33. From Table 7, for example, the second school on the list is Aranui High School. This decile 2 school achieved 59.4% in NCEA level 1 in 2009 and 66.3% in NCEA level 1 in 2011 (refer to Appendix 2). Therefore, the change in results is an increase of 6.9%. This is substantial considering the effects of the Canterbury earthquake on NCEA results in 2010, but not surprising when examining the extent of the state interventions into education during 2011 in the greater Christchurch region.

In contrast to the 2009-2010 pattern of change it is evident that low decile or low SES schools now had the greatest increases in NCEA performance. For NCEA level 1, the analysis indicates for each increase in one decile, the NCEA performance, as a percentage of change, decreased by 1.54% (refer to Figure 31). The significant aspect of this graph is all lower decile schools (ratings 2-4) increased their NCEA level 1 results from 2009. The four decile 10 schools achieved the highest results as a decile group in 2009 and they were able to maintain this academic focus in 2011. What is of interest is the scattering of results among the mid decile schools. This suggests some schools may not have administered the NZQA earthquake impaired derived grade process for all students or some students were not aware of the entire process (detailed in Appendix 10).

The 2011 NCEA level 2 results, as a percentage of change from 2009, are shown in Figure 32. As with the 2011 NCEA level 1 results, the associated regression coefficient of -2.2597 indicates that for each increase in one decile, NCEA performance as a percentage of change from 2009, decreased by

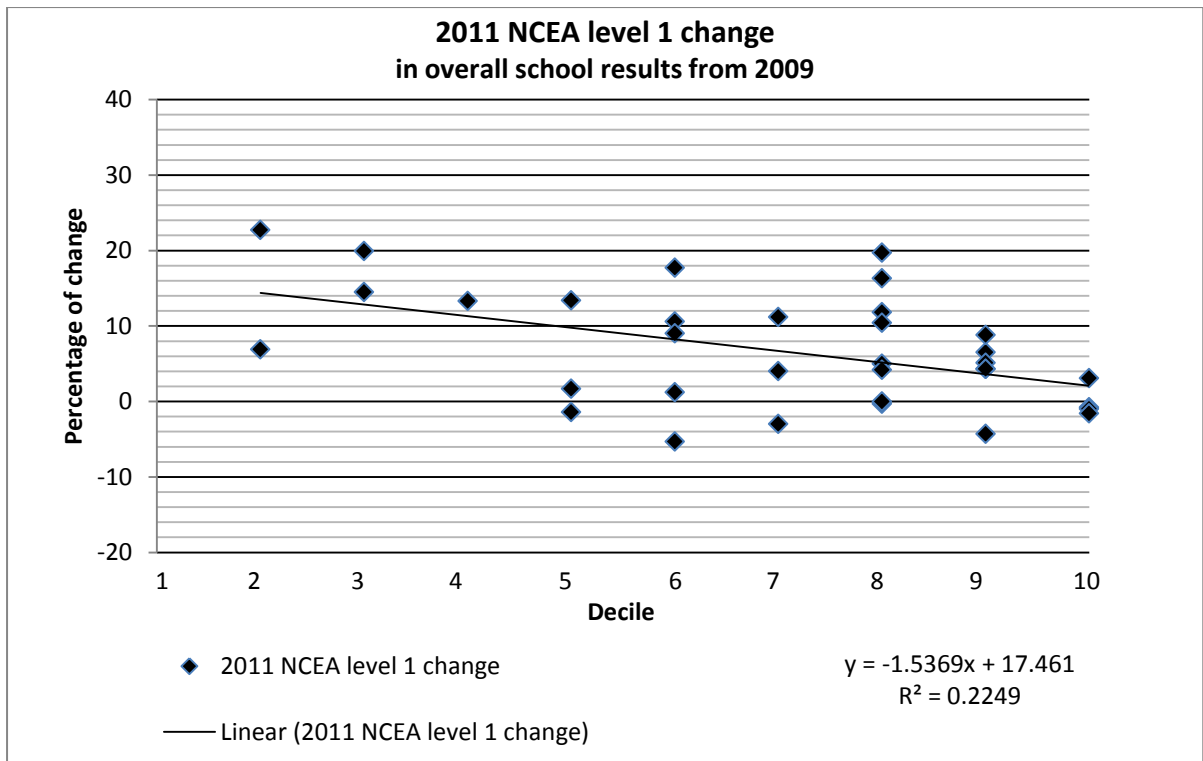


Figure 31: 2011 NCEA level 1 results as a percentage of change from the 2009 NCEA level 1 results

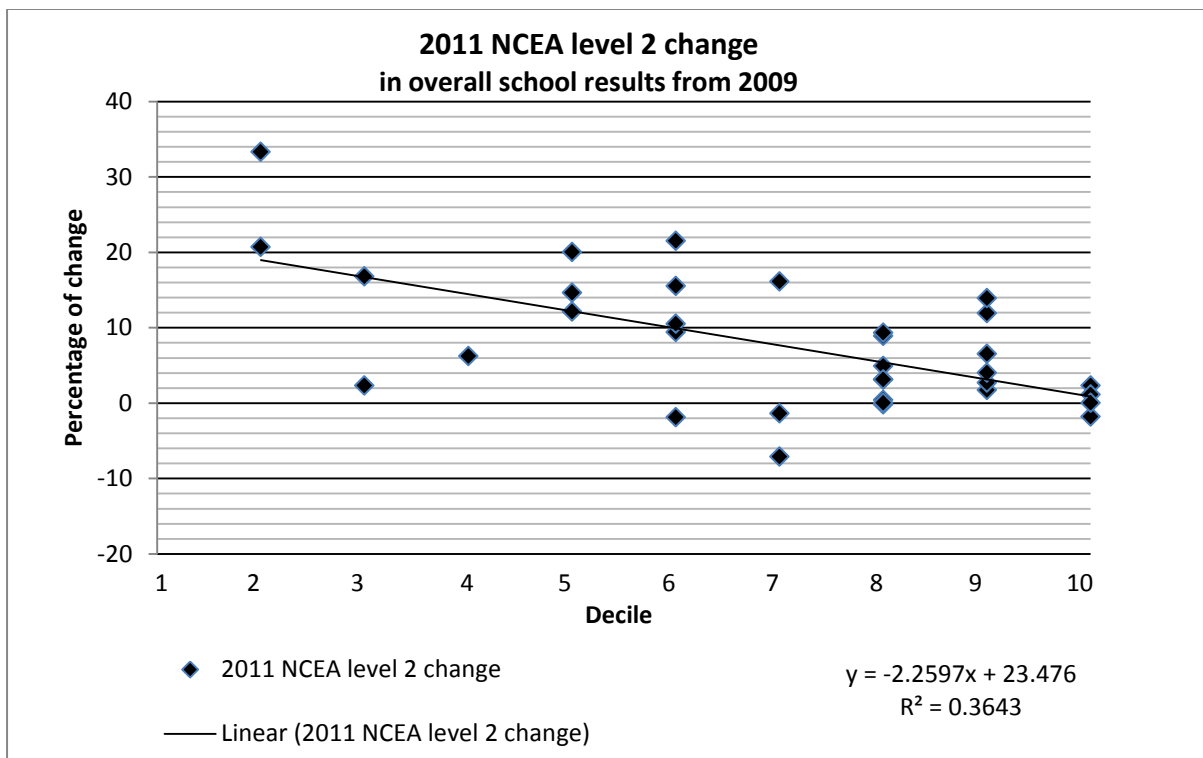


Figure 32: 2011 NCEA level 2 results as a percentage of change from the 2009 NCEA level 1 results

2.26%. This indicates a negative relationship between school decile rating and a change in NCEA performance. The significant aspect of this graph is the stronger negative relationship between decile rating and achievement. The results indicate the older the student and the lower the decile rating of the school, the higher the increase of NCEA achievement when compared to the previous two years. Where education inequalities existed prior to the first earthquake in September 2010, the lower the decile school the more favourable the schools results were in 2011. But the positive relationship between decile ranking and student achievement still exists.

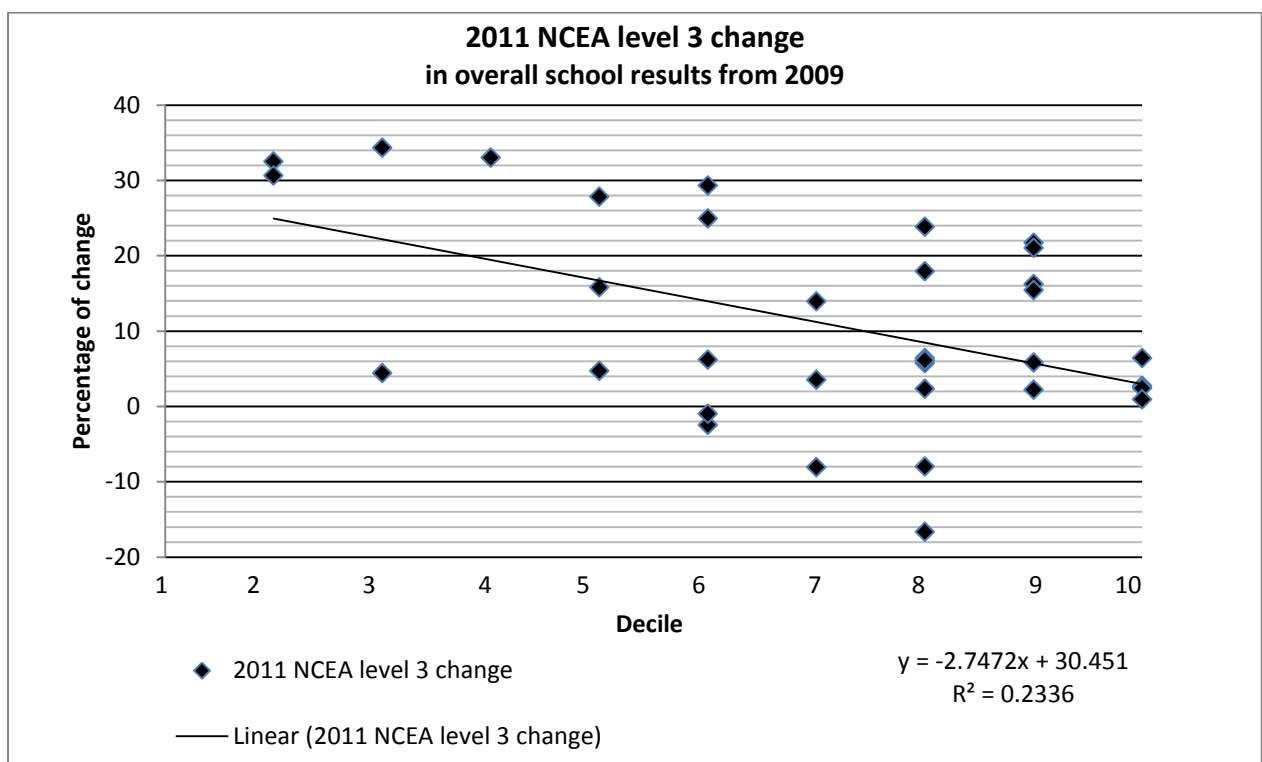


Figure 33: 2011 NCEA level 3 results as a percentage of change from 2009 NCEA level 3 results

For 2011 NCEA level 3 the results are similar (refer to Figure 33). As with previous 2011 NCEA results (Figures 31 and 32), the results indicate for each increase in one decile, the NCEA performance, as a percentage of change, decreased by 2.75%. Only five of the 34 schools achieved 2011 NCEA level 3 results lower than those published in 2009. The scattering of the results within decile ratings is

significant, as is the high increase in NCEA achievement of the lower decile schools. Year 13 students are studying towards entry to University and other tertiary institutions. The NCEA level 3 results in 2011 indicate secondary schools within the greater Christchurch region comprise of students achieving this level within their education.

The 2011 NCEA level 1-3 results, from each secondary school, as a percentage of change from the previous year were then combined under decile rating and this data is summarised in Table 9. It is evident that low decile schools had the highest rates of change, which ranged from a high of 33.3% for the low decile two schools to 6.4% for decile 10 schools. There is no negative minimum percentage of change for a secondary school within the low decile range of 2-4.

Table 9: 2011 NCEA levels 1-3 results as a percentage of change from 2009 NCEA results

SCHOOL DECILE										
Decile	1	2	3	4	5	6	7	8	9	10
Average	0	24.5	15.4	17.5	12.1	9.7	3.2	5.6	8.2	1.1
Median	0	26.7	15.7	13.3	13.4	9.4	3.5	5.0	6.2	1.0
Minimum	0	6.9	2.3	6.2	-1.4	-5.3	-8.1	-16.7	-4.3	-1.8
Maximum	0	33.3	34.3	33.0	27.8	29.3	16.1	23.8	21.7	6.4

State interventions into education is one reason for the increase in 2011 NCEA levels 1-3 results for some greater Christchurch secondary schools, which are detailed in Chapter 4 and discussed in the final chapter of this thesis. The next section of this chapter now examines secondary schools that

hosted visiting schools and compares their NCEA results with schools that had no disruption to their normal school day. Further research into visiting schools is the content of Chapter 7.

6.5.1 Did site-sharing of secondary schools affect educational performance?

State interventions into the education of students at greater Christchurch secondary schools enabled many students to achieve NCEA with the assistance of earthquake impaired derived grades and site-sharing agreements. Without the State, many schools would not reopen for several months, and the student ('the market') would have either remained in Christchurch (because their parents were employed and home owners) or moved out of Christchurch (which occurred for many students whose parents rented their accommodation). Students that remained in Christchurch would have placed pressure on operating schools to increase their enrolment. Many schools were already operating with restrictions of classroom space due to minor damage. Site-sharing agreements maintained a student population, a market for schools to be rebuilt and new enrolments for the existing three regional tertiary institutions; University of Canterbury, Lincoln University, and Christchurch Polytechnic Institute of Technology.

When examining the 2011 NCEA results of site sharing schools, three scenarios (regardless of decile rating) are worth further analysis. Firstly, how did the NCEA results of site sharing schools compare locally, regionally and nationally with non-site sharing schools in greater Christchurch? Secondly, how did NCEA results of short-term site sharing schools compare with long term (until end of school year) site sharing schools? Finally, how did visiting site sharing east-Christchurch schools compare with east Christchurch schools that remained on site and operated with minor damaged school buildings? The NCEA results of all schools are categorised under this analysis and examined in this section of the chapter (refer to Figures 34, 35 and 36).

Site sharing versus non-site sharing schools

The 2011 NCEA results are graphed in Figure 34 into four categories; site-sharing schools (both hosts and visitors), non site-sharing schools in the greater Christchurch region, Canterbury secondary schools which includes all schools in the greater Christchurch region and other schools in the providence of Canterbury, and all secondary schools in New Zealand. The thirty four greater Christchurch secondary schools (listed in Table 7) form two categories: the site-sharing schools (both hosts and visitors) and non-site sharing schools. The four categories form four lines through the data points for levels 1-3. The results are tabled below the graph. Results illustrate how non site-sharing schools in the greater Christchurch region achieved higher results than site-sharing schools and that this difference was particularly marked at lower NCEA levels.

Site-sharing schools achieved lower 2011 NCEA levels 1-3 than non site-sharing schools. Site-sharing schools also achieved lower 2011 NCEA levels 1-3 than Canterbury schools combined. The NCEA level 2 and 3 results for Canterbury as a region are higher than all greater Christchurch schools. The NCEA results for all Canterbury secondary schools, whether they entered into a site sharing agreement or not, were higher than the national average.

The significant aspects of this graph is the percentage gap between the NCEA Canterbury results and NCEA Nationally results, and the merging of the NCEA level 3 results for site sharing and non-site schools in the greater Christchurch region. The percentage gap of 5.2 - 6.2% between NCEA Canterbury and NCEA National results across all three levels may illustrate the intervention processes by the state. The merging of NCEA level 3 results of greater Christchurch schools may indicate that the older students (aged 17-18 years) reacted similarly to their education during 2011 regardless of the change of school hours or displacement. But still the results for greater Christchurch schools are higher than the national results which may indicate resilience to some but

when taking into consideration the State's intervention into education through the earthquake impaired derived grade process, the results illustrate how the State has succeeded in maintaining the marketability of education in the earthquake region.

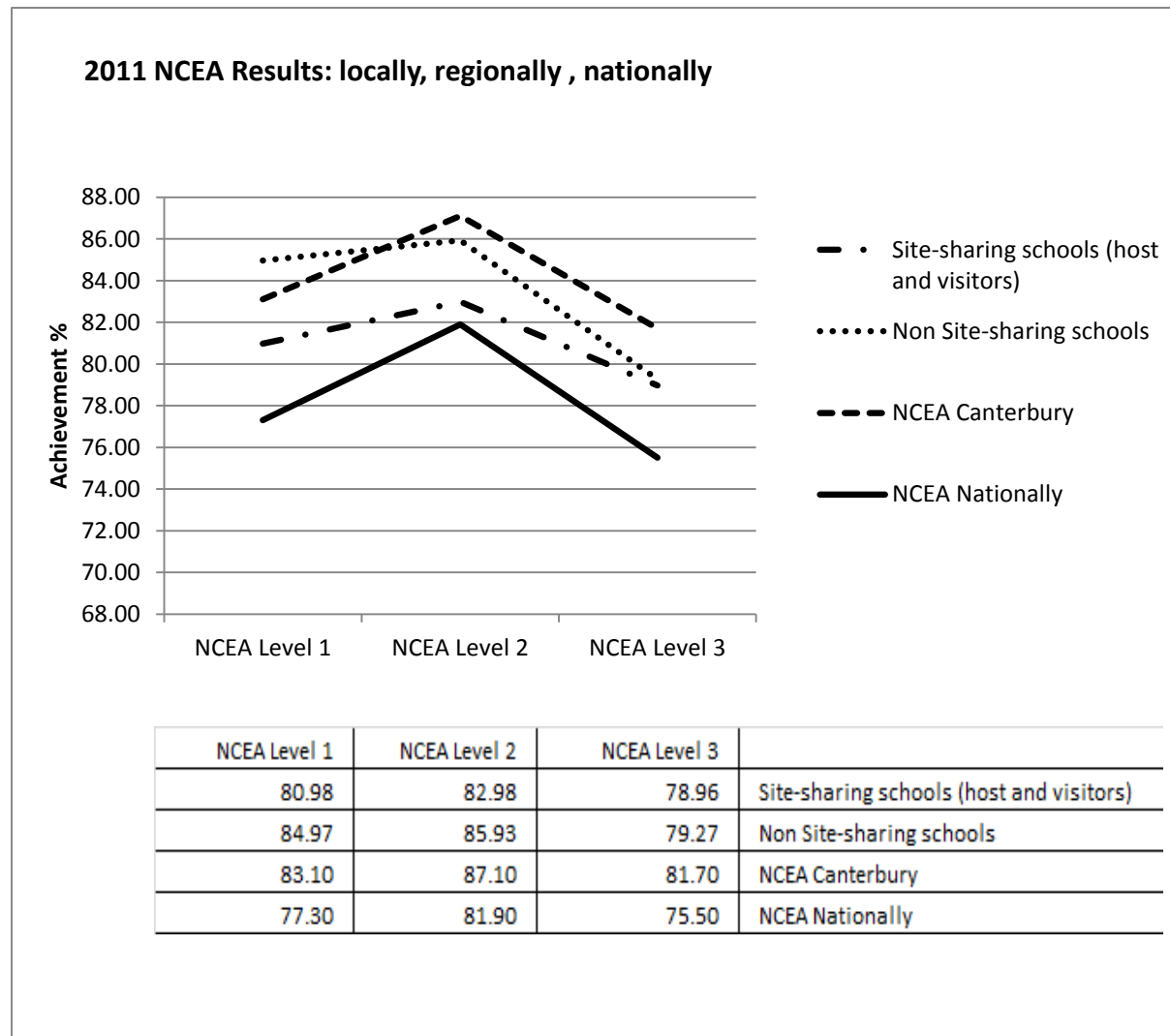


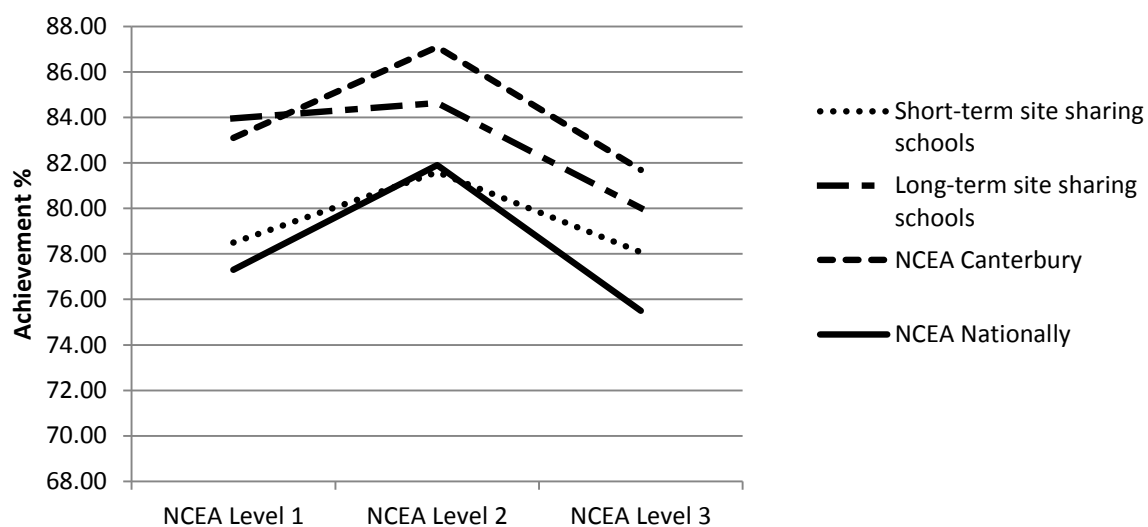
Figure 34: 2011 NCEA Results - site sharing schools vs non site sharing schools

Effects of duration of school site sharing: short versus long-term

Comparison of the duration of site sharing is compared with regional and national NCEA results in Figure 35. Short-term site sharing schools were Cashmere High School, Catholic Cathedral College, Linwood College, Papanui High School, St Thomas of Canterbury College, and Shirley Boys' High School. Long-term site sharing schools were Avonside Girls' High School, Burnside High School, Marian College, St Bede's College, and Unlimited Paenga Tawhiti. Site sharing schools include both the host and the visitor school and are listed Table 5 of Chapter 4. Long term site sharing schools maintained the same school hours and without any further change through to the end of the school year in December 2011. Long-term site sharing students from visiting school sat their NCEA external examinations at their host school.

The NCEA results of short term site sharing schools (both host and visitors) are close to the NCEA results nationally with the NCEA level 2 results showing a difference of only 0.30%. The results of long term site sharing are higher than short term and this may be explained through the decile rating of the schools (higher overall than the short term site sharing schools) or ability to adapt to the routine of continual displacement without having to undergo further change and disruption by moving back to their original school site. The significant aspect of this graph is long term site sharing schools achieved higher NCEA level 1 results than short term site sharing schools but these are lower than the overall NCEA Canterbury results. Site sharing agreements did not significantly reduce the NCEA results nationally but their results did not overly exceed the NCEA levels 1-3 results of Canterbury schools.

2011 NCEA Results: short term site sharing schools vs long-term site sharing school, regionally and national results



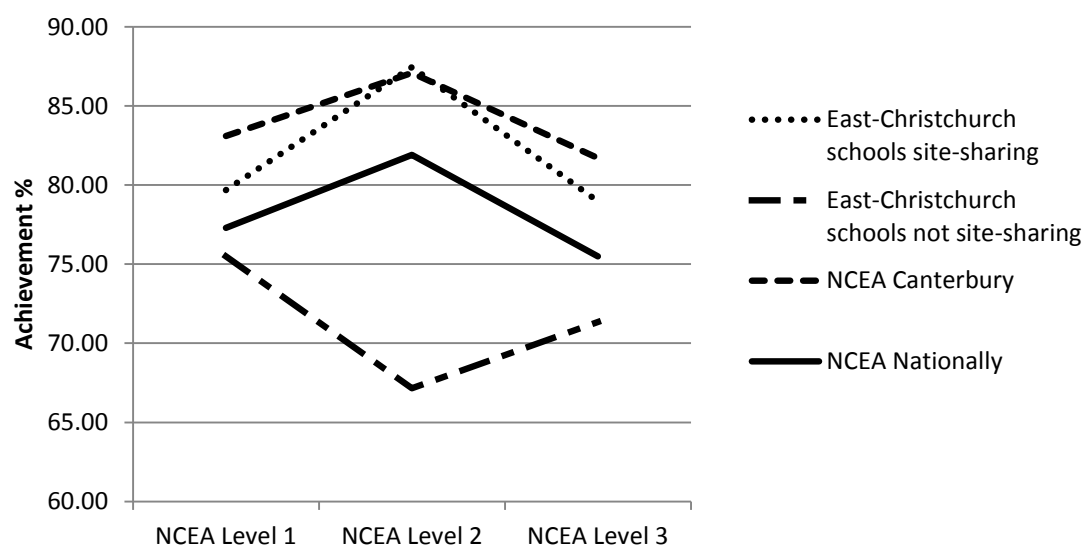
NCEA Level 1	NCEA Level 2	NCEA Level 3	
78.50	81.60	78.08	Short-term site sharing schools
83.96	84.64	80.02	Long-term site sharing schools
83.10	87.10	81.70	NCEA Canterbury
77.30	81.90	75.50	NCEA Nationally

Figure 35: 2011 NCEA results of site sharing schools. Short-term site sharing schools that were able to return to their either their original site and/or school hours before the end of the school year. Long-term site sharing schools remained site sharing until the end of the school year in 2011

Site sharing versus non-site sharing schools in eastern Christchurch

Not all east Christchurch secondary schools entered into site sharing agreements with other schools in 'safer' regions of the city. Two schools: Aranui High School (decile 2) and Mairehau High School (decile 4) remained on site and operated normal school hours once the schools opened following the Christchurch earthquake. The NCEA results of these two secondary schools are now compared with four other east Christchurch schools that became visiting schools; Avonside Girls' High School, Linwood College, Marian College, Shirley Boys' High School. The two east Christchurch schools that did not site share have levels of achievement lower than the National average, but individually as schools they achieved higher NCEA results in 2011 than in previous years (refer to Appendix 2). The NCEA level 2 average results for Canterbury schools are similar to the site sharing schools from east Christchurch. Decile rating of the schools, indicating the deprivation levels of the school's student composition, may also be a factor in the range of NCEA results.

2011 NCEA Results: short term site sharing schools vs long-term site sharing school, regionally and national results



NCEA Level 1	NCEA Level 2	NCEA Level 3	
79.68	87.45	78.98	East-Christchurch schools site-sharing
75.50	67.15	71.35	East-Christchurch schools not site-sharing
83.10	87.10	81.70	NCEA Canterbury
77.30	81.90	75.50	NCEA Nationally

Figure 36: 2011 NCEA results of east Christchurch schools. East-Christchurch schools not site-sharing in 2011 were Aranui High School (decile 2) and Mairehau High School (decile 4). Four east-Christchurch schools that site shared were Avonside Girls' High School (decile 6), Linwood College (decile 2), Marian College (decile 7) and Shirley Boys' High School (decile 6).

6.6 Did educational inequalities between greater Christchurch secondary schools widen as a result of the 2010 – 2011 earthquakes?

National Certificate in Educational Achievement (NCEA) results for 2012 were officially released by the New Zealand Qualifications Authority (NZQA) on 2 April 2013 (www.nzqa.govt.nz). In order to analyse the education performance of greater Christchurch secondary schools during 2012 this section will be divided into three parts. 2012 is seen as the recovery year since the highest seismic event during this year was recorded on 2 January 2012. The first part will compare social gradients of school performance in 2012 with those in 2009 in order to examine the extent to which inequalities in educational performance widened in Christchurch following the major seismic events. Second, changes in education performance across thirty four Christchurch schools before and after the seismic years of 2010 and 2011 are also considered first by examining patterns of change between 2009-2012 and then for 2011-2012

6.6.1 Social gradients in school performance 2012 and 2009

NCEA results from 2012 (Figures 37-39) show, as expected, a positive relationship between decile ratings and achievement. The results show for each increase in one decile, school NCEA performance increased by 4.5% for level 1, by 3.5% for level 2, and 4.1% for level 3. Table 10 suggests that, when compared to the 2009 regression results that educational inequalities in the greater Christchurch region have not increased, but instead reduced slightly since the earthquakes. The relationship between school decile rating and NCEA achievement levels is strongest for NCEA level 2 in 2009 and weakest for that level in 2012, with the size of the regression coefficients also reducing for levels 1 and 3.

Two other features are of interest. First, in 2012 relative to other NCEA levels, there is a stronger gradient in results among younger students. This aspect is discussed further in Chapter 8. Second, the higher R^2 values for levels 1 and 3 in 2012 suggest that, while the social gradient in school performance may have reduced slightly, in 2012 there was also less variation in NCEA results between similar decile schools resulting in higher R^2 values for two of the three NCEA levels.

Table 10: Regression Analysis of Decile Ratings and NCEA School Achievement, Christchurch 2009 and 2012

NCEA Level	Regression Coefficient*		R^2	
	2009	2012	2009	2012
Level 1	4.9716	4.5233	0.5268	0.6355
Level 2	5.2222	3.5142	0.7159	0.5217
Level 3	4.4535	4.1261	0.3249	0.3408

* NCEA Achievement Levels (%) by School Decile Ratings

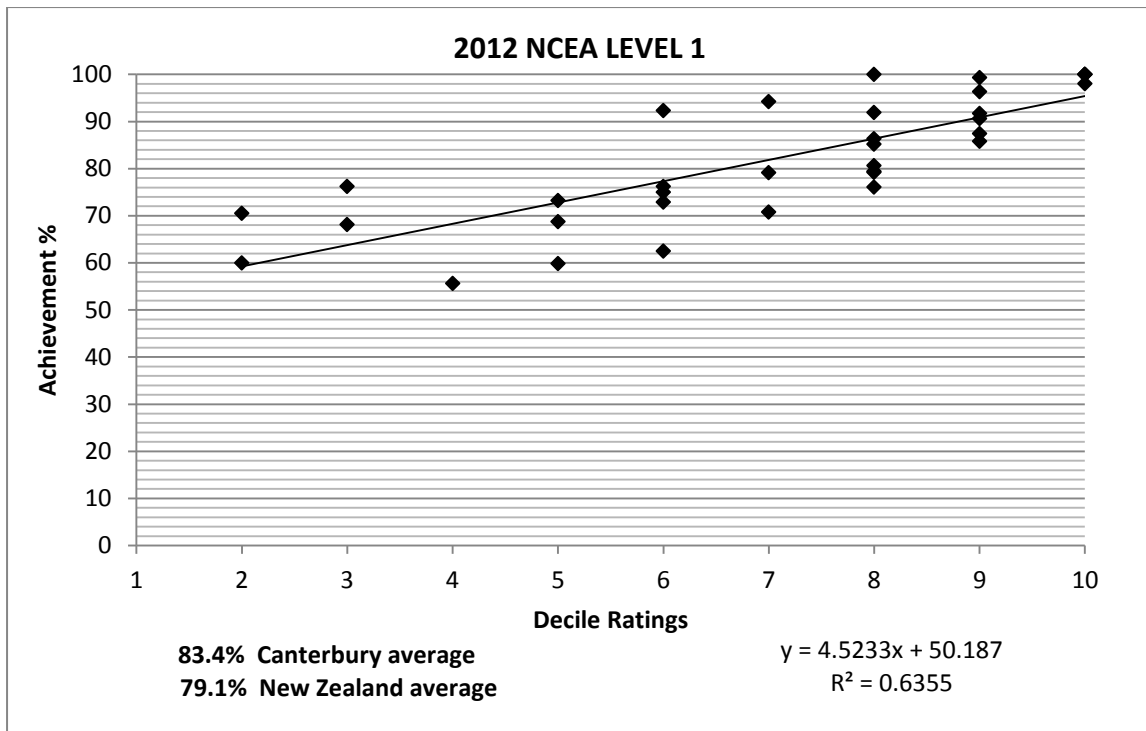


Figure 37: 2012 NCEA Level 1 results

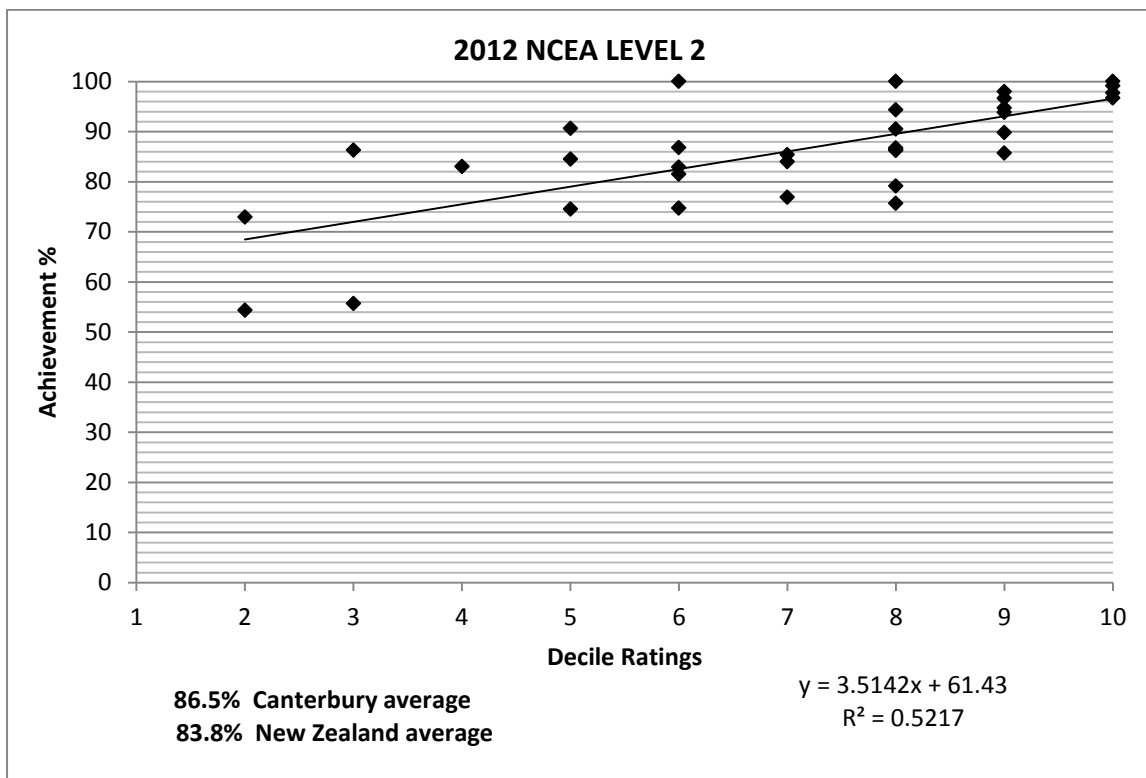


Figure 38: 2012 NCEA Level 2 results

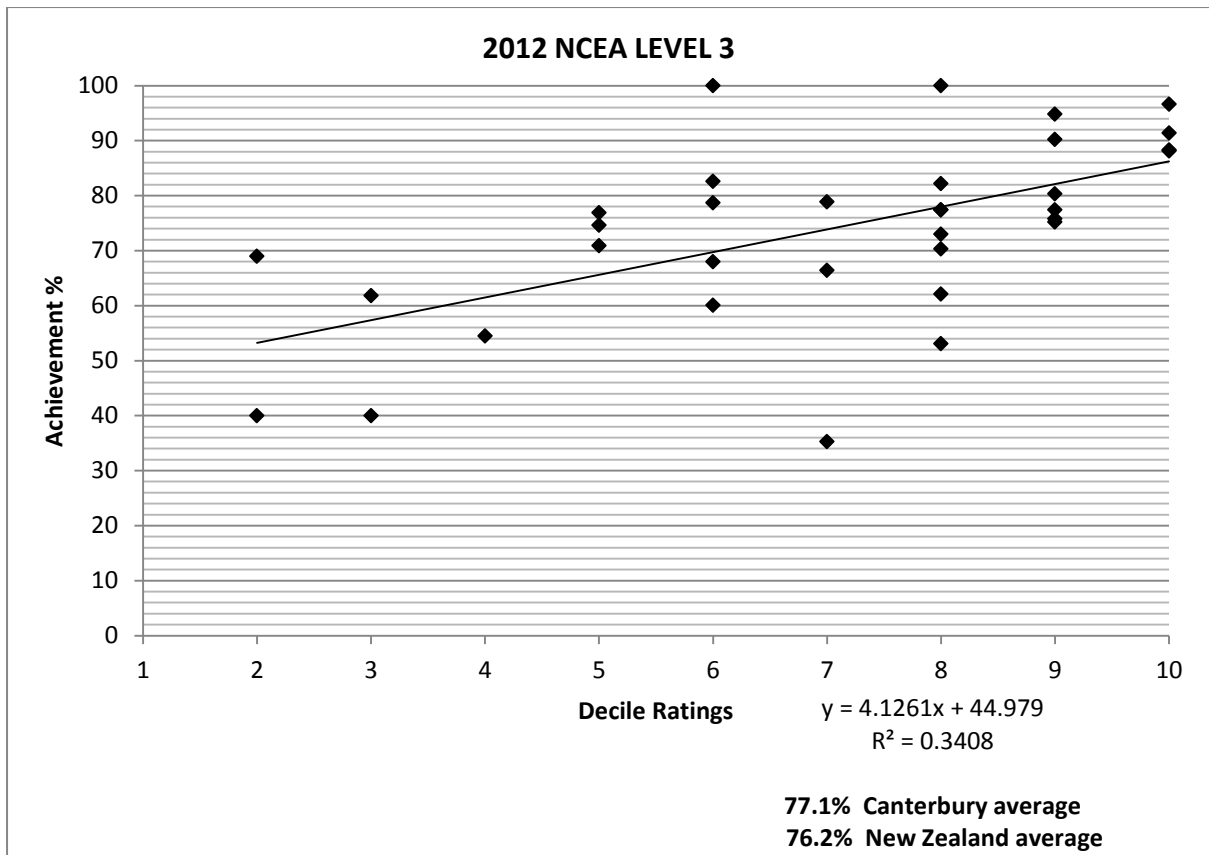


Figure 39: 2012 NCEA Level 3 results

6.6.2 Patterns of change in NCEA results

NCEA 2012 results in comparison to NCEA 2009 as a percentage of change

The 2012 NCEA level 1-3 results, from each secondary school, as a percentage of change from 2009 are summarised in Table 11. Overall the range of the average percentage of change is positive with the exception of decile 3 schools. The highest decile 10 schools have maintained their high achievement results and all other schools have increased their school's performance, with the exception of two decile three schools.

When the pattern of change in 2012 from those in 2009 is examined, regression analysis shows that while there is a negative relationship against all three levels of NCEA (Figures 40-42), this is only significant for NCEA level 2. With respect to the other two levels of NCEA no clear social gradient in the level of change exists thus suggesting that the slight narrowing of overall social differences in achievement since 2009 has largely occurred amongst younger and older students.

Table 11: 2012 NCEA levels 1-3 results as a percentage of change from 2009 NCEA results

	Decile									
	1	2	3	4	5	6	7	8	9	10
Average	0	19.3	-2.1	0.8	13.3	7.5	0.8	7.7	7.4	0.0
Median	0	20.5	-3.2	0.4	17.1	9.4	-2.6	5.4	6.2	-0.8
Min	0	0.6	-24.7	-15.8	-2.8	-15.3	-12.3	-14.4	1.1	-3.5
Max	0	32.5	22.7	17.8	26.1	24.2	17.8	50.0	16.9	5.6

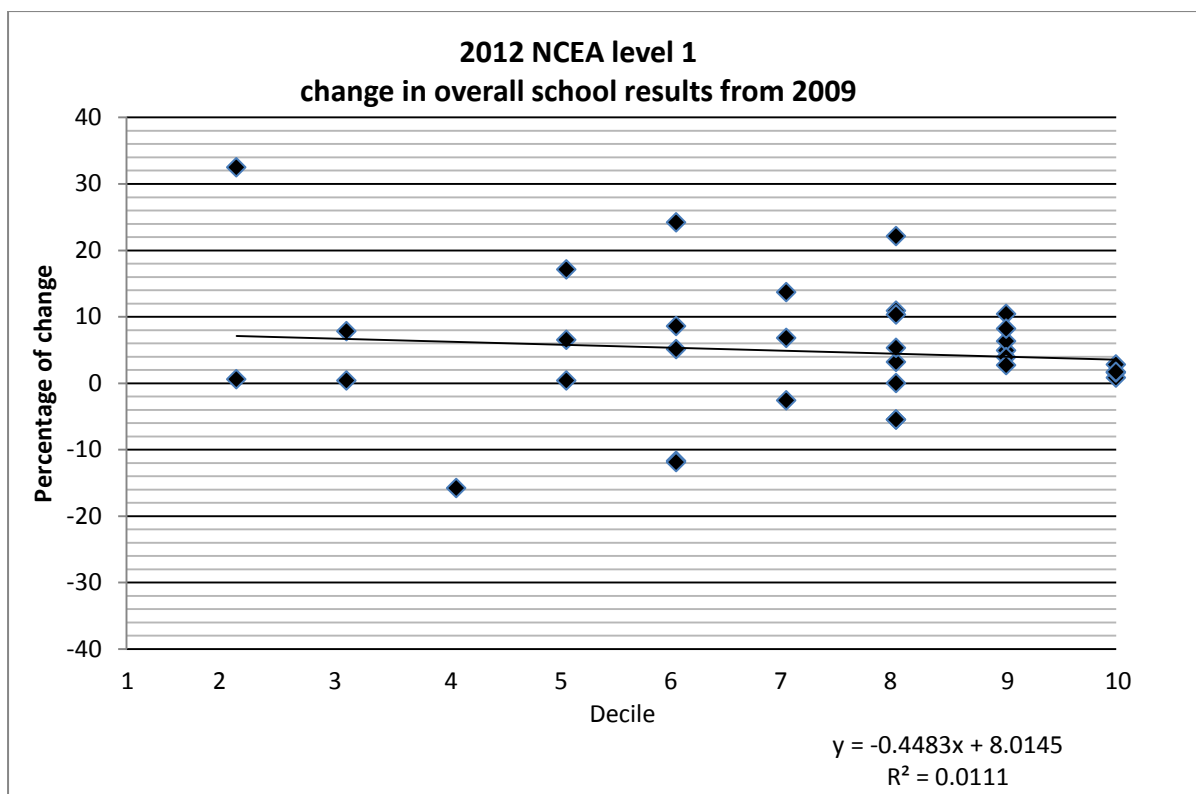


Figure 40: 2012 NCEA level 1 results as a percentage of change from 2009 NCEA level 1 results

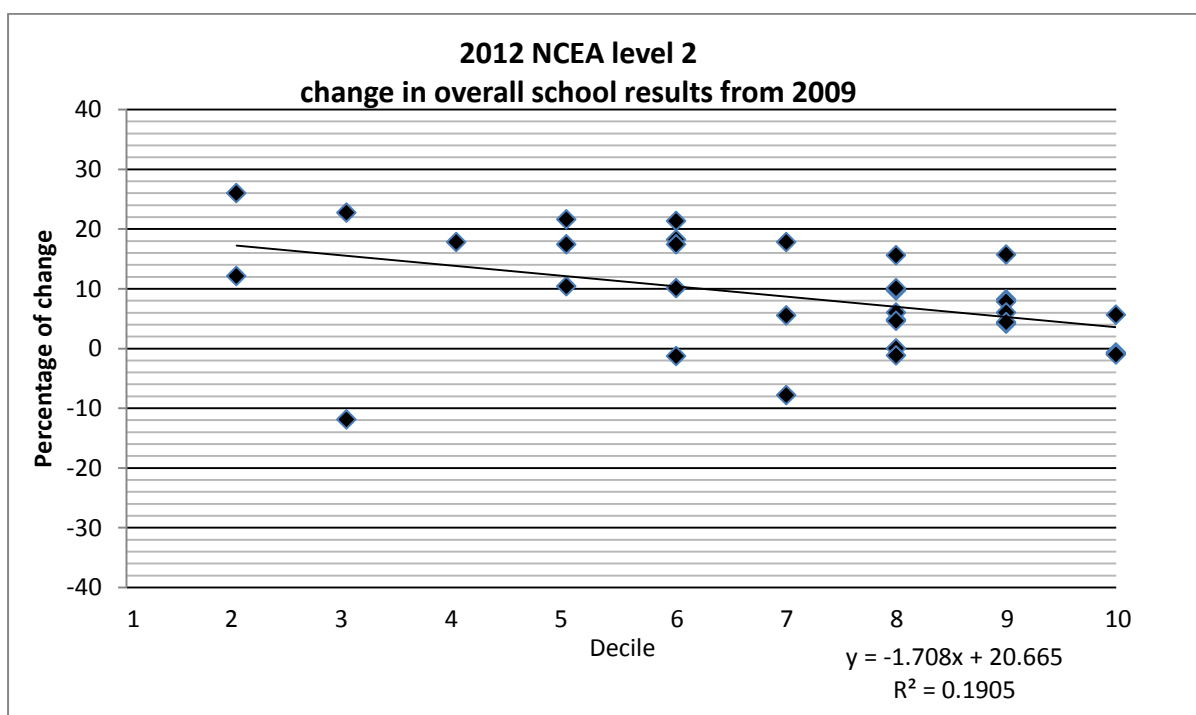


Figure 41: 2012 NCEA Level 2 results as a percentage of change from 2009 NCEA level 2 results

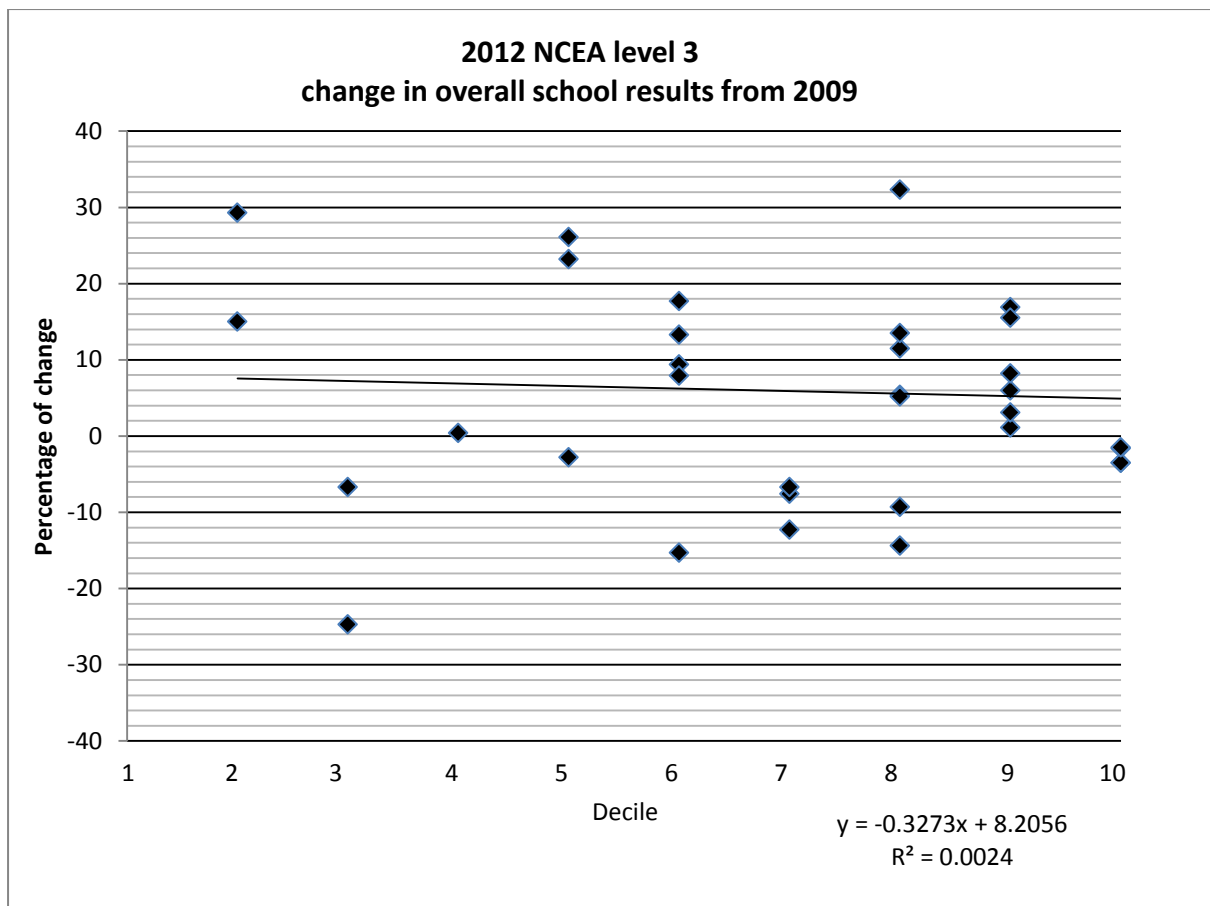


Figure 42: 2012 NCEA Level 3 results as a percentage of change from 2009 NCEA Level 3 results

NCEA 2012 results compared to NCEA 2011 results

The same analysis was repeated for 2011-2012 NCEA results. In contrast to the pattern which existed between 2009-2012, for 2011-2012 all the regression coefficients are positive, indicating that for each increase in decile, NCEA performance also increased (Table 12). The significant aspect of the difference is higher SES schools did much better in 2012 when compared with 2011, than lower SES schools. This trend is most marked for level 3 students with a regression coefficient of 2.4199 indicating for each increase in one decile, the NCEA performance, as a percentage of change, increased positively by 2.42%. Graphing of the percentage of change between 2012 and 2011 NCEA results levels 1-3 are illustrated in Appendix 12. NCEA results are tabled in Appendix 2.

Table 12: Change in Overall School Results 2011-2012 and 2009-2012

NCEA Level	2011-2012		2009-2012	
	Regression Coefficient	R ²	Regression Coefficient	R ²
Level 1	1.0886	0.0795	-0.4483	0.0111
Level 2	0.5517	0.0184	-1.708	0.1905
Level 3	2.4199	0.1032	-0.3273	0.0024

6.7 Conclusion

Secondary schools within the greater Christchurch region did not experience the same impacts from the Canterbury earthquakes of 2010 and 2011. Some schools were displaced while other schools in the city were not. The 22 February 2011 was not a normal school day for secondary school students and many were unsupervised and alone when the earthquake struck. Now, in 2013, many families are still waiting for their homes to be earthquake repaired and many school age children are suffering from ill-health and stress, and they require additional support.

In 2009, educational inequalities existed between secondary schools in the greater Christchurch region. Each of the thirty-four secondary schools in the region had students that had failed to achieve NCEA. Across all levels of NCEA in 2009 there is strong positive relationship between decile ratings and achievement. When schools are grouped by decile rating, the NCEA 2009 level 2 results indicate for each increase in one decile, the NCEA performance increased by 5.22%.

In 2010, the Canterbury earthquake of 4 September 2010 woke Canterbury residents. The majority of secondary school students were at home and experienced this natural event with family members. Outside of the home environment, secondary school students were studying towards school exams and NCEA internal examinations. The external NCEA examinations were held in November 2010. When the schools were grouped into decile rankings and their 2010 NCEA levels 1-3 results were compared with the previous year, the percentage of change indicates an overall lower NCEA achievement in 2010 across all deciles. Lower decile schools had lower levels of achievement in 2010 than the previous year indicating a disproportionate effect of the Canterbury earthquake when compared with other higher decile schools.

In 2011, the Christchurch earthquake of 22 February 2011 was an urban natural disaster and 185 people died as a result of their injuries. Six secondary schools became visiting schools to six host schools and the displaced students travelled greater distances, with reduced teaching time and school hours. State intervention into the education of Christchurch secondary school students who had experienced this earthquake led to the 'earthquake impaired derived grade' process (Appendix 11).

When the schools were grouped into decile rankings and their NCEA results from 2011 were compared to 2009 (the year before the first earthquake), as a percentage of change, regression analysis showed a negative relationship against all three levels of NCEA. In other words, lower decile schools, which had the lowest education performance in NCEA achievement levels up to 2009, now, in contrast to that year, fared better in 2011. State intervention and 'school effects' within each lower decile school had attributed to higher student achievement.

When the 2011 NCEA results from site sharing schools (host and visitors) were compared against non-site sharing schools, the Canterbury average, and New Zealand average, it was found that non site sharing schools achieved the higher results than site-sharing schools and that this difference was particularly marked at lower NCEA levels. The Canterbury average (which included all greater Christchurch secondary schools), was higher than the New Zealand average.

When site sharing schools were further analysed into two groups; long term and short term, it was found the long term schools (where visiting students sat their NCEA external examinations at their host school) achieved higher in 2011 NCEA than the short term site sharing schools. When the NCEA 2011 results of lower decile east-Christchurch schools were compared between each other, they were also analysed into two groups; site sharing schools and non-site sharing schools. Overall, the east-Christchurch site sharing schools achieved higher NCEA achievement than the east-Christchurch

non-site sharing schools. But their results did not exceed the Canterbury average in 2011 NCEA levels 1 and 3. The east-Christchurch secondary schools that remained on site achieved lower than the Canterbury and New Zealand averages.

In 2012, educational inequalities still exist and as in 2009, there is still a direct positive relationship between decile rating and NCEA achievement across all levels 1-3. But regression analysis indicates when schools are grouped by decile rating, the relationship between decile and achievement is weaker in 2012 than 2009. Regression coefficients are negative indicating lower SES schools, when grouped by decile rating, have fared marginally better in their NCEA achievement results in 2012 than 2009.

Given the detrimental effects of the Canterbury earthquakes and the positive impacts of state intervention during 2011, regression analysis indicates when secondary schools are grouped by their decile ratings and NCEA results for 2012 are compared with 2009, educational inequalities did not widen as a result of the Canterbury earthquakes. The social gradient in NCEA achievement was marginally less or relatively similar in 2012 than in 2009 across all NCEA levels. But some secondary schools are achieving lower NCEA results after the earthquakes and this will be discussed in Chapter 8. To understand further the impacts of one natural event on one east-Christchurch school community, Chapter 7 will take the reader through the experiences of school aged children and adults as they coped with the impacts of the Christchurch earthquake and aftershocks in 2011.

Chapter 7: Impacts of the Canterbury earthquakes and aftershocks on one Christchurch secondary school community.

7.1 Introduction

The Canterbury earthquake on 4 September 2010 and subsequent major aftershocks altered the geography of the greater Christchurch region. The 22 February 2011 aftershock, referred locally as the 'Christchurch earthquake' caused building collapse, loss of life and disruption throughout the region.

The impacts of the earthquakes and aftershocks on education and learning were surveyed at one east Christchurch secondary school in October 2011, thirteen months after the first earthquake event. This school has a mid-decile ranking and the overall 2009 educational performance of the school indicate more than two thirds of the students achieve NCEA levels 1-3. This school was displaced to another school in Christchurch due to structural building and land damage resulting from the 22 February 2011 aftershock. Some school buildings were demolished during 2011. Liquefaction caused the land surface to slump and sealed areas to crack. This displaced school entered into a site-sharing agreement where the visiting school hours changed from the normal 8.30am until 3pm to a start time of 1pm where school then ended at 5.35pm, Monday to Friday. The school cannot be named in this chapter due to requirements set down by the University of Canterbury Human Ethics Committee, who approved this research. Participants in this research are school students, teachers and staff, and parents and caregivers. The objective of this chapter is to examine the impacts of the earthquake and aftershocks on the teaching and learning within this school community, through various geographical perspectives.

This chapter will take the reader through the experiences of our participants from the first earthquake on 4 September 2010 until one year later after they had experienced more than ten thousand aftershocks. This chapter will be a story, a record, of the participants' lives as they coped with the impacts of these natural events in a modern society.

A synthesis of questionnaire results from students, teachers and staff, parents and caregivers, will be geographically analysed under four perspectives: the spatial effects, socio-economic impacts, displacement, and health and wellbeing. Spatial effects will include their location and what the participants remember seeing and experiencing during the three major seismic events of 2010 and 2011. Socio-economic impacts will focus on the change in the home environment, loss of income and employment, and financial constraints. Displacement looks at the change in school location, change in school hours, transportation, and the role of place. Health and wellbeing looks at the unavailability of afternoon school sport, change of dinner times and sleeping hours, anxiety levels and includes participants own reflection on their state of health. There will be no comparison in results between a parent participant and their child who also participated. Within this chapter the processes within these four perspectives are integrated to holistically illustrate the impacts of these natural events on this school community.

Participation in this research was completely voluntary. Refer to the Methodology (Chapter 5) for more details on the approval process. Students required written parental consent. No incentives were provided. Students were informed of this research during form time by their form room teacher. Teachers and Staff were informed of this research at a staff briefing. Parents and Caregivers were informed of this research through the school website and an information sheet provided to the students. A total of 154 questionnaires (refer to Table 13) were received from the three groups. The completed questionnaires provide a wealth of written responses to various

questions pertaining to the impacts of the earthquakes and aftershocks. Not all the participants' responses have been included in this chapter.

Table 13: Questionnaires received from various groups within one school community in 2011

Participant groups	Approximate age groups	Number of completed questionnaires	Reference group coding
Year 9 Junior School	Between 12-14 years of age	18	JS01-JS18
Year 10 Junior School	Between 13-15 years of age	7	JS19-JS25
Year 11 NCEA Level 1	Between 14-16 years of age	13	SS01-SS13
Year 12 NCEA Level 2	Between 15-17 years of age	25	SS14-SS38
Year 13 NCEA Level 3	Between 16-18 years of age	7	SS39-SS45
Parents and Caregivers	Adults	29	PC01-PC29
Teachers and Staff	Adults	55	TS01-TS55
Total		154	

Each questionnaire provides both qualitative and quantitative responses to an individual's experiences of the seismic events over 2010 and 2011. Blank questionnaires and consent forms are available in the appendix section of this thesis.

This chapter does not analyse the NCEA achievement of individual students. Instead it examines the impacts of the earthquakes and aftershocks on teaching and learning. Following the urban natural disaster of 22 February 2011, each student's education performance was affected. Each parent and caregiver that participated in this research experienced a range of changes in their lives. Each teacher that experienced this event while inside the Christchurch Town Hall describes the

destruction inside the auditorium and then their experience of walking out into the central city urban disaster zone.

7.2 Education performance

As discussed in earlier chapters, education performance looks at the student at an individual level where educational inequalities studies the broader geographical perspective of grouping schools by socio-economic data and location. Traditional and current forms of education inequality often refer to social class and family background, gender, and race and ethnicity as contributors towards differing educational achievement outcomes between students of the same ability.

Although schools make a difference, the biggest influence on educational achievement, how well a child performs in school is family background (Wilkinson and Pickett, 2009). Many students rely on family support to assist them to achieve to their academic ability. This support can vary with each student and each household, for example, some students require homework assistance from siblings, friends or parents while other students feel confident and competent to complete their homework alone. Some home environments provide a quiet space to study, perhaps their own bedroom with a desk and chair, with internet and a personal computer, while some home environments are busy places and students find spaces to study outside of their home, for example, the school library, green spaces or with a friend at their home. If a student is not achieving to their ability, some families will intervene and employ a tutor to raise the achievement levels of their child. Any disruption to the normal routine of a secondary school student will impact on their education performance.

7.3 Spatial effects

The spatial effects of the Canterbury earthquake and aftershock sequence changed the lives of each participant within this research. None of the participants had experienced an earthquake of the same magnitude as they experienced on 4 September 2010. Only one participant was in the same location for the largest three seismic events in 2010 and 2011; the rest were in different places and with different people. The location of 'where they were' and 'who they were with' and 'what they saw' changed their lives. Participants in this research are teachers and staff, parents and caregivers, and secondary school students (aged between 13 and 18 years of age). The range of experiences that participants witnessed impacted on their lives and had an effect on how they coped when they experienced the next seismic event.

This section of Chapter 7, analyses the effects of the largest three seismic events of 2010 and 2011 on our Christchurch participants through acknowledging their previous earthquake experiences, spatially discussing their location within the city during the three seismic events, assessing their 'felt' earthquake experiences against the New Zealand Modified Mercalli Intensity Scale, and finally summarising their questionnaire responses within the themes of education, teaching and learning.

Previous earthquake experiences

None of the participants had previously experienced an earthquake of the same or greater magnitude as the first seismic event on 4 September 2010 (M_w 7.1). Age was a factor in determining previous earthquake experiences. Secondary school students had less previous earthquake experiences than their teachers and parents. While none of the Year 10 students surveyed had ever felt an earthquake, four out of five adults had. Previous felt earthquakes while living in Christchurch included Kaikoura (M_w 6.1, 1965), Inangahua Junction (M_w 6.7, 1968), and Arthurs Pass (M_w 6.7,

1994). One participant was living in the Bay of Plenty in 1987 and felt the Edgecumbe earthquake ($M_w6.1$). Previous earthquake experiences of our participants were mild in comparison to what they felt when the 4 September 2010 seismic event struck at 4.35am on a Saturday morning.

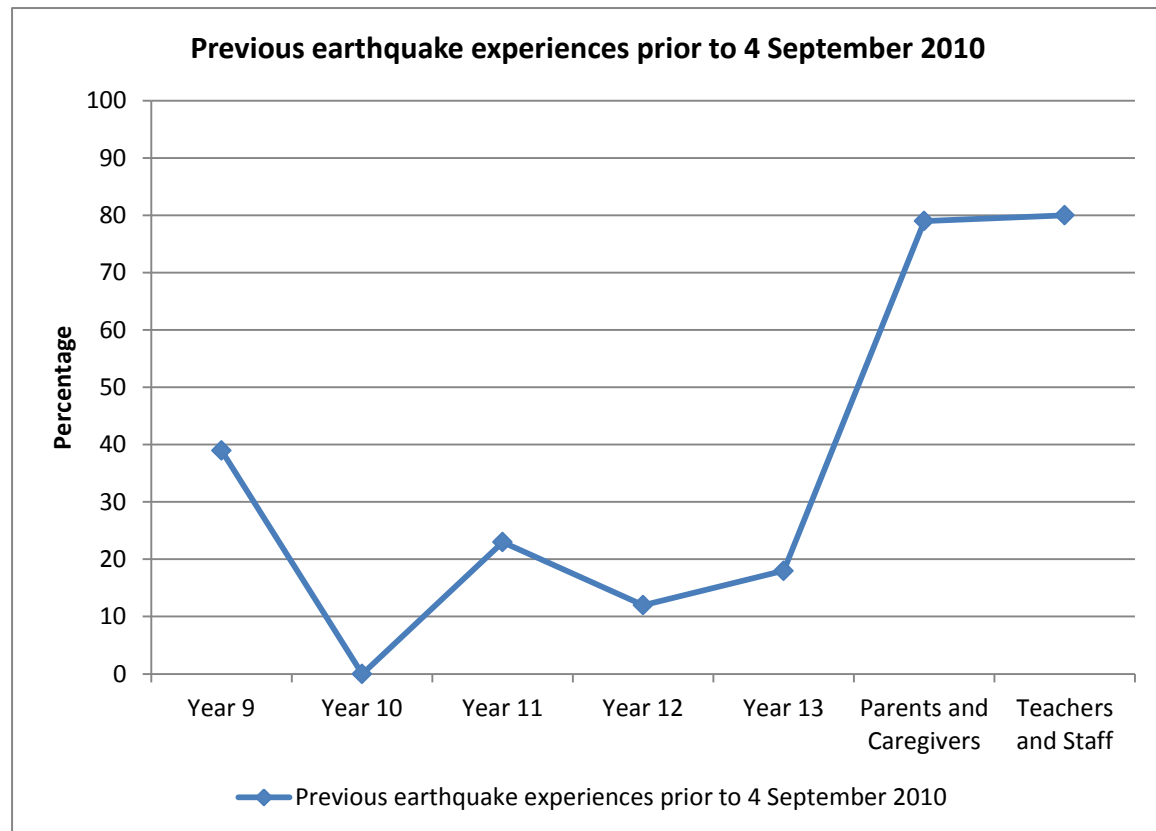


Figure 43: Previous earthquake experiences prior to 4 September 2010

Three major seismic events

During 2010 and 2011, three major seismic events in the Canterbury region caused widespread damage and the deaths of 185 people (refer to Table 4 in Chapter 4). Prior to 2010, very few residents of Canterbury had experienced an earthquake of the same magnitude or any other natural urban disaster. Only one of the participants experienced all three major seismic events during 2010

and 2011 in the same location; at home. This participant was with their family for the Canterbury earthquake on 4 September 2010 but alone for the Christchurch earthquake on 22 February 2011 ($M_w6.34$) and 13 June 2011 ($M_w6.41$) earthquake. All other participants experienced these three natural events at more than one location, with different people and with differing responsibilities. The roles of the participants altered with each event depending on what they felt, what they saw, what happened to those around them; who took charge and what happened next.

Generally, students and teachers were home for the first event, at a variety of locations for the second event as it was not a normal school day, and at school for the third event. One teacher participant was home with her young family when the first event occurred in September 2010, but in February 2011 this same participant was seated alongside work colleagues within the Town Hall, while in June 2011 she was in her classroom standing in front of her form class students. The roles of being a parent, a friend and then a teacher required this one person to take charge dependent on what their responsibilities were at that time. A teacher that is also a parent, now in charge of a classroom of students is also concerned for the safety of their own family and home during a major earthquake or aftershock event.

Depending on location, members of the same family had different experiences in what they felt and saw in others around them during the two large seismic events in 2011. Together as a family, they had different recounts of their experiences on those days. Once they were together in their home environment, depending on the location of their home, they experienced further impacts of that day's earthquake or aftershock with house damage, loss of infrastructure (water and sewerage), loss of family pets, broken items inside the house, fallen down brick chimneys, liquefaction both inside and outside the home, cracks in their land and driveways.

The effects of the earthquakes and aftershocks on an individual cannot be categorised the same for the rest of their family or for their community as none of the participants experienced these three major seismic events with the same people at the same place. Secondary victims may become primary victims when their income is reduced due to the impacts of the earthquake and aftershocks on their place of work.

Canterbury earthquake: Saturday September 4, 2010 at 4.35am

The majority of participants were at home when the first earthquake occurred on September 4, 2010 at 4.35am. Those not at home were either staying with family or friends in Christchurch or away for the weekend (refer to Table 14). Only one participant was overseas on this day. This earthquake was felt from Invercargill in the south to Wellington in the north, therefore all participants with the exception of one teacher felt this earthquake.

Table 14: Location of participants on 4 September 2010

Participant groups	At home for 4 September 2010	Not at home but in Christchurch	In other regions of New Zealand (not Christchurch)	Overseas
Year 9	14 (78%)	2 (11%)	2 (11%)	0
Year 10	6 (86%)	1 (14%)	0	0
Year 11	11 (85%)	2 (15%)	0	0
Year 12	22 (88%)	3 (12%)	0	0
Year 13	5 (72%)	1 (14%)	1 (14%)	0
Parents and Caregivers	27 (94%)	1 (3%)	1 (3%)	0
Teachers and Staff	51 (93%)	1 (2%)	2 (3%)	1 (2%)

This earthquake lasted about 40 seconds and caused widespread damage and power outages.

Sewers and water lines were broken. Liquefaction occurred throughout Christchurch with greater extent in the eastern and coastal communities. The school closed and re-opened once health and safety assessments were completed. There was no major structural damage to the school buildings

or property following the Canterbury earthquake on 4 September 2010. Many of the participants moved out of their homes temporarily until services were restored. Only three participants state that the move was permanent and that they were living at a new address when the 22 February 2011 aftershock occurred.

First major aftershock 'Christchurch Earthquake': Tuesday February 22, 2011 at 12.52pm

Tuesday February 22, 2011 was not a normal school day for state secondary schools in Christchurch. Two paid stop work meetings organised by the Post-Primary Teachers Association were being held on this date in the Auditorium of the Christchurch Town Hall, located in the Central Business District. The location of our research participants vary on this day in comparison to other state secondary schools in the region. In other parts of Christchurch, teachers that had attended the morning stop work meeting were making their way back to their school or they had just arrived for afternoon lessons. Due to a school's proximity to the CBD, some afternoon classes had already commenced when the February aftershock hit. This is an important factor in understanding the spatial effects of this major seismic event on individuals. Secondary schools in the region cannot be grouped and the impacts of this earthquake generalised, as it was not a normal school day. Within the participants, only an average of 8% of each student and teacher group, were at school to experience the Christchurch earthquake on 22 February 2011.

When this earthquake struck, 58% of teacher participants were already seated in the Auditorium awaiting the start of the 1pm afternoon session. A further 12% were in the Town Hall Foyer queuing to enter the Auditorium while 10% were outside the Town Hall or walking towards the complex (refer to Table 4 for the categorisation of locations during this seismic event). Within the three groups of 'seated inside', 'standing in the foyer' and 'standing/walking outside on the pavement' individual results explain this felt earthquake event.

The majority of participants inside the Town Hall had already experienced the September 2010 earthquake and the sounds of aftershocks over the previous four months as they rumbled through the city. Inside the Auditorium, some participants state they heard “the noise coming. I called out ‘Earthquake’ just before it hit” while another said “It started with a loud bang”. Some wrote the “Town Hall started rocking”, “huge thumping sound up and down movement like a huge dinosaur stamping on the ground”, “huge shaking” and “Extreme fear”. While others saw “Signs swinging” and “sounding buffers swinging back and forwards” before the “Lights went off – very dark” and once dark they heard “echoing noise”, “some screams”, “crashing of glass” and “cracking noises”. One teacher, that was overseas during the September 2010 earthquake, summed up her experience: "The noise of the earthquake and people around me. Thinking - so this is a big earthquake (I wasn't in NZ in Sept 2010). Other people were ducking for cover but I didn't instead watched the sides of the Town Hall (I was seated) moving side to side."

A teacher that had just sat down five rows from the back of the Auditorium “got up immediately and found my way to the door frame” where she “saw glass crashing in the foyer, one piece narrowly missing – man, timber falling and a huge crack opening up in the white marble floor in the foyer”. While others standing in the foyer felt the “violent shaking” and were “thrown to my knees” and heard “glass shattering” and experienced “a terrifying and utterly unnerving, bewildering experience”. While another teacher writes, “Feeling of immense power overwhelming me. Being pushed, thrown around by the force. I don’t remember ‘seeing’ anything – just sounds and feelings.”

Once the ground shaking ceased, teachers were able to exit the Town Hall and saw “the panic of people running outside”, “people with injuries”, “the damage to the pavement” and “the welling up of liquefaction through cracks 5-10 minutes after the shake” and “smelt gas.” Teachers already

outside watched the “Town Hall rocking”, the “building on the corner collapsed” and “facades falling off buildings”. The Christchurch Town Hall did not collapse but was structurally damaged. Its position alongside the Avon River intensified damage due to lateral spreading of the ground surface. Inside the Town Hall’s Foyer, the marble floor cracked open. From the Foyer ceiling, long glass light bulbs crashed together spraying glass onto the floor.

Inside the Town Hall, teacher numbers exceeded one thousand. Outside, as groups they assembled and collectively assessed ‘what to do next?’ Teachers write about “pale faces, people on phones”. Others felt traumatised “I went into mild shock, felt sick and afraid but stayed calm to help older colleagues.” One teacher “took the roll and people started to walk back to school”. Another teacher reflects on this walk “Dust and haze everywhere in the street. Collapsed buildings, rushing water coming out from under the Town Hall. Walking back to school – great crevices, whirlpools, cloudy disturbed river – Fitzgerald Ave area onwards very badly affected – debris, water, mud, abandoned vehicles, people sitting on grass berms”. Others walked past collapsed office buildings and watched “people being rescued”. Others tried to drive out of the city but one teacher was stopped when “driving down Manchester Street, the Fire Brigade said ‘to go back’ so I left my car and walked.” Following the initial earthquake at 12.51pm, “the ground continued to shake” and aftershocks of $M_w5.84$ and $M_w5.91$ were recorded at 1.04pm and 2.50pm respectively.

Back at school, there were no formal teaching classes that afternoon but some student participants were in the library and the school’s photography darkroom. Teachers and staff were also present at other parts of the school and when the earthquake struck they felt “violent shaking, being thrown out of my chair and landing on my back on the floor” and “shaking caused me to fall off chair – couldn’t move – felt worse than September’s shake”. A teacher was “unable to get in the ‘turtle’ position because of continued violent shaking” while another writes how she remembers the

"severe shaking, sheltered under bench, computers falling all around". One describes how a "window blew out" and "lights swinging crazily" and could hear "vases/ornaments/plates crash off bookshelves/window sills and smash". Some "doors were unable to open -floors had risen". One Year 9 student who was the school library describes how "books falling off the shelves, the loud rumbling, cracks appearing in the walls/ceilings, liquefaction coming from the ground, the shocking silence afterwards". One Year 12 student was in the darkroom when the earthquake struck and wrote "Couldn't see anything because the lights went off and no windows in the darkroom. Remember panicking because door jammed shut. Remember thinking the building was going to fall down. Could hear all the chemicals toppling into in the sink." Once outside, one teacher states that teachers, staff and students at school were "very shaken" and students were "upset until able to contact parents". When driving east towards home a teacher states how "Bridges impassable, a 20 minute journey took 4 hours, constantly re-routing, driving bumper to bumper" through silt and mud with "liquefaction up to top of wheel arch". The school buildings were structurally damaged as a result of this earthquake. The school is closer to the epicentre than the Christchurch Town Hall so the peak ground acceleration levels, vertically and horizontally, were higher.

Many students were unsupervised by adults and had to take responsibility for their own safety when the earthquake struck. Only 27.8% of Year 9 students were home during the 22 February 2011 event, the rest were either still at school, at a suburban mall, with friends or relatives at their house, travelling on a bus or walking home (refer to Table 15). A strong percentage of each student group was at a suburban mall when the aftershock struck.

Table 15: Location of participants on 22 February 2011 at 12.52pm

Participant groups	At home on 22 February 2011 @ 12.52pm (%)	At School (%)	Outside the CBD either driving/busing/ walking (%)	At a suburban mall (%)	In the CBD (%)	At another location within greater Christchurch (e.g. with friends, at work)
Year 9	27.8	5.5	16.7	22.2	0.0	27.8
Year 10	28.6	0.0	28.6	28.6	14.2	0.0
Year 11	23.1	7.7	23.1	38.4	0.0	7.7
Year 12	48.0	4.0	4.0	36.0	0.0	8.0
Year 13	28.7	14.2	14.2	28.7	0.0	14.2
Parents and Caregivers	37.9	0.0	6.9	3.5	13.8	37.9
Teachers and Staff	3.6	14.6	0.0	0.0	80.0	1.8

A majority of parent participants were at work (51.7%) with 13.8% of work places being located in the CBD. Parents were located throughout Christchurch and provide varied responses to how this earthquake felt. A parent working in Rolleston (22km south-west of Christchurch) was unaware of the destruction of this earthquake and remembers "Standing in a doorway, didn't seem very big, because was out in Rolleston...." While another parent in the CBD experienced the full destruction of this earthquake with the "CTV Building and St Pauls Church falling down. A lot of shocked and terrified people. Worrying if husband and children OK. Not sure where my children were. No car or phone with me to check. Walked home - heaps of water and destruction."

To convert 'felt' earthquake experiences of our research participants into a recognised scale, the New Zealand Modified Mercalli Intensity Scale (refer to Table 16) has been used for scale range and description. The participants' experience (total of 149 as five participants did not write down their earthquake experiences) has been entered along the description that 'fits' their written responses and then their location is recorded. As predicted the further away from the epicentre the least felt

effects were experienced. Felt earthquake experiences for the Christchurch earthquake (M_w 6.34, MM 9) range from MM 5 upwards.

Students travelling home when the Christchurch earthquake struck experienced a range from MM 6 to MM 8 based on what they wrote in their questionnaire. Minor damage occurs above Modified Mercalli (MM) intensity 6 and structural damage above MM 8. The allocated intensity scale ranged from 1 to 9 and 'greater than MM 9', although the scale itself goes as high as MM 12. Intensities above MM 9 are usually determined by engineers who inspect damaged structures in some detail (www.geonet.org.nz). Therefore, some participants in the CBD experienced a destructive earthquake but as Geonet determine a scale greater than MM 9 as being determined by engineers, the scale has been recorded as 'of greater than MM 9' in this thesis.

Forty seven participants (30.5%) were located within the central business district and experienced the destructive forces of this earthquake. Two of the participants were students travelling on separate buses while the other participants were adults. One of the students got off the bus at Latimer Square and witnessed "People panicking, crying, bleeding. Collapsed buildings (CTV). A lot of people running around the streets into Latimer Square. (SS-14)"

Table 16: Participants place and experience of the Christchurch Earthquake of 22 February 2011 within the context of the New Zealand Modified Mercalli Intensity Scale (Simplified)

Participants' Place (22Feb2011)	Number and % of Participants* (149 participants)	Participants' experience (22Feb2011)	MM Scale	Mercalli Intensity Scale Description (www.geonet.org.nz)
			MM 1: Imperceptible	Barely sensed only by a very few people
			MM 2: Scarcely felt	Felt only by a few people.
			MM 3: Weak	Felt indoors as a light vibration.
			MM 4: Light	Generally noticed indoors.
In Rolleston (22km from CBD)	1 (0.7%)	Ground shaking	MM 5: Moderate	Generally felt outside and by almost everyone indoors.
Bus stop on Ferry Road. Walking home	11 (7.1%)	Liquefaction. Pot holes forming. Scared people	MM 6: Strong	Felt by all. Slight non-structural damage to buildings may occur.
At bus stop near Palms Mall. At home inside. Passenger in car or bus.	34 (22.1%)	Ground opening up. Liquefaction. Cars crashing into each other. People crying and frightened.	MM 7: Damaging	General alarm. People experience difficulty standing.
At School. In school library. In the Palms Mall. At home inside.	43 (27.9%)	Cracks appearing in walls (building later demolished). Chimney falling. Books falling off shelves. People screaming. Loss of light and power.	MM 8: Heavily damaging	Alarm may approach panic. A few buildings are damaged and some weak buildings are destroyed.
Walking near the Palms Mall. Walking home.	13 (8.4%)	Crashing as the church wall fell down. Water/sewage pouring out into the streets	MM 9: Destructive 22 Feb 2011	Some buildings are damaged and many weak buildings are destroyed.
On a bus in Latimer Square, CBD. On a bus in Gloucester street, CBD. In the Auditorium of the Chch Town Hall, CBD	47 (30.5%)	People running/crying/panicking/bleeding. Collapsed buildings (CTV & St Pauls Church). Manholes exploding. Ceiling lights crashing, trampled on, broken floors. Dead people.	MM 10: Very destructive >MM9	Many buildings are damaged and most weak buildings are destroyed

<<http://www.geonet.org.nz/earthquake/geonet-modified-mercalli-intensity-scale.html>> [Accessed 30 August 2012]

*Five parent participants (3.2%) did not write down their earthquake experience of 22 February 2011

June 2011 Aftershock events: 1pm and 2.20pm

Following the September 2010 earthquake event, 7814 aftershocks were recorded before the aftershock events on Monday 13 June 2011. This day was ‘the new normal’ school day: site sharing had commenced and school started with form time at 1pm.

At exactly 1pm, a $M_w5.89$ aftershock struck, the highest recorded aftershock since 22 February 2011. This was followed by several small aftershocks until 2.20pm, when a $M_w6.41$ aftershock struck, the highest recorded aftershock since the first earthquake on 4 September 2010 (refer to Chapter 4, Table 4).

Only two student participants were absent from school on this day. Once the 1pm aftershock occurred on 13 June 2011, many students experienced “fear” but “happy we were all together”. One student, which was later collected from school by one of the student’s parents, felt “scared, wanted to go home”. Following the first aftershock at 1pm, 17% of parent participants had collected their children from school before the larger second aftershock occurred at 2.20pm.

All student participants on 13 June 2011 had previously experienced an urban natural disaster that caused death and destruction. Parents that were able to travel to collect their children from school on the 13 June 2011 drove from instinct with the knowledge that further aftershocks would soon occur.

7.4 Socio-economic impacts

Within all urban environments there is a measure of wealth that is available through home ownership, house and land values, and the income of the residents. Existing educational inequalities often reflect the social contours of an urban environment. Following the 22 February 2011 natural disaster, there was a disproportional effect within the urban environment of Christchurch. Earthquake damage to land and buildings did not occur in all parts of the city. The aim of this section is to assess the changes in the home environment of participants, the loss of income and employment that resulted from the earthquakes, and the financial constraints placed on family members during 2011.

The home environment

On the 23rd June 2011, the Prime Minister John Key and Canterbury Earthquake Recovery Minister Gerry Brownlee released information about the state of the land in greater Christchurch. Advice from geotechnical engineers saw all greater Christchurch land divided into four residential zones – red, orange, green and white. Red indicated the land is unlikely to be able to rebuilt on for a considerable period of time. For people who owned property in the red zones, the state would be making an offer to purchase the property or land. As at the 17 December 2012, 6,391 red zoned property owners have signed sale and purchase agreements, and of those 5,212 have already settled with the state. (www.cera.govt.nz)

A majority of participants, including teachers, resided in the eastern suburbs of Christchurch when the first earthquake struck on 4 September 2010. Some participants moved home temporarily after the three major seismic events due to “no power or sewerage”, or “no essential services” while others moved permanently due to “house damage” or “house red-stickered”. Disruption occurred in

several home environments with the loss of power and water following each major seismic event, causing families to move temporarily three times over one year until the services were restored. One family remained living in their damaged home after the first event, but had to leave after the 22 February earthquake as their home was now unsafe for them to reside in.

Two junior students indicate that their residential homes are in the damaged red zone although they were still living in their homes when completing this questionnaire during October 2011. Four teachers were resident in the red zone and indicated they would remain living there until the sale and purchase agreement was completed with the state.

Loss of employment

The earthquakes' destruction of homes and buildings also impacted on businesses and the income of the adult participants. To gauge the socio-economic level of our school community, student participants were asked 'what jobs do your parents/caregivers work at?' Responses to this question were classified using the New Zealand Standard Classification of Occupations (NZSCO). The NZSCO was also analysed from questionnaires completed by Teacher and Staff participants.

(www.stats.govt.nz)

A limitation of this part of the research is the subjective ability of the students to be able to name the 'job' their parents or caregivers do. They were not asked to write down the education level of their parents or caregivers nor the gross income of their household. Nevertheless, the importance of this part of the research is to determine the socio-economic impacts of the earthquakes and aftershocks on this school community.

The Christchurch City Council website (www.ccc.govt.nz) provided research into the NZSCO of Christchurch and New Zealand workers taken from the latest 2006 census. The school enrolment

zone is located within three local government electoral wards, but it was decided not to include the worker occupation on this level. The data shows that our school community is reflected as an average representative group of Christchurch workers (Table 17).

The occupations of Students' fathers show equal status for both 'Professionals' and 'Elementary Occupations'. Examples of these categories are 'teachers' and 'labourers' respectively. None of the student participants named their father or mother as working in the 'agricultural or fisheries' sector. Above average both locally and nationally was in the 'Trade Workers' sector. When a student did not write down a 'job' for their mother or father, the 'job' for that parent is entered as 'No Occupation'. The jobs of 10% of fathers and 21.4% of mothers appear within the 'No Occupations' category. More mothers worked as 'clerks' than fathers, with a much larger percentage of mothers than fathers working as 'service and sales workers'.

Of the teacher and staff participants, the highest occupation status was the school's principal, whose occupation is recorded as 'General Manager'. A teacher's occupation is categorised as 'Professional'. Responses included those from the office staff.

A student's disclosure of their parents 'job' was then linked to changes in their home environment with regards to loss of employment. Four junior students and one senior student indicated their parent/caregivers had lost their job due to the earthquakes. These occupations are listed as "cleaner" (twice), "mows lawns", "caregiver", and "office work" and fall into 'elementary' and 'clerks' occupation codes (refer to Table 17). The 'elementary occupation' code is an over-represented category within the school community when compared to Christchurch as a whole. How loss of employment affected students differs in each home environment. One student wrote that "it hasn't really (affected me) but I have heard a lot of conversations involving money and I

always feel bad about it (JS12)”, while another wrote “not have as much spending money, have to be careful what we use our money on JS20)”.

Table 17: Occupations of our adult participants in comparison with local and national data using the New Zealand Standard Classification of Occupations (NZSCO95)

Occupation (NZSCO* Codes)	Students’ Fathers (n=70)	Students’ Mothers (n=70)	Teachers and Staff (n=55)	Christchurch ** (n=178,092)	New Zealand ** (n=1,985,778)
Legislators, Administrators, Managers	12.9	4.3	1.8	14.2	14.3
Professionals	18.5	15.7	94.5	15.4	14.7
Technicians / Associate Professionals	8.6	10	0	13.3	12.1
Clerks	10.0	11.4	3.7	11.4	11.0
Service and Sales Workers	4.3	14.3	0	15.4	13.5
Agriculture / Fishery Workers	0	0	0	2.0	6.5
Trade Workers	10.0	2.9	0	8.6	8.5
Plant / Machine Operators and Assemblers	7.1	1.4	0	7.5	7.6
Elementary Occupations	18.6	18.6	0	12.2	11.8
No occupation supplied	10.0	21.4			
Total	100.0	100.0	100.0	100.0	100.0

‘n’ represents the ‘number’ of workers

*New Zealand Standard Classification of Occupations from 1995 Census [online] Available from <[http://www2.stats.govt.nz/domino/external/pasfull/pasfull.nsf/0/4c2567ef00247c6acc256b0400682195/\\$FILE/Nzsco95.txt](http://www2.stats.govt.nz/domino/external/pasfull/pasfull.nsf/0/4c2567ef00247c6acc256b0400682195/$FILE/Nzsco95.txt)> [Accessed on 6 December 2012]

** Available from

<<http://www.ccc.govt.nz/cityleisure/statsfacts/census/occupationandqualifications.aspx>> [Accessed on 6 December 2012].

Teachers also indicated uncertainty of future employment due to a reduction of student enrolment at the east Christchurch school following the earthquakes. As a school's operating fund is based on the student roll, a reduction in the student population directly impacts on the number of teachers approved for employment at any school. A curriculum and pastoral needs analysis (CAPNA) is a document which allows a school to analyse its staff usage and is most commonly used when a school has a falling roll (www.ppta.org.nz). In Christchurch, many schools commenced and completed a CAPNA during the latter part of 2011. The CAPNA was in progress while the questionnaires were being completed by teachers who wrote how "Life is harder now with redundancies and CAPNA", "I feel some anxiety about my future as a teacher", while another wrote "a feeling of uncertainty regarding the future for me and my family, i.e. when to start a family and will I have a job next year?"

Following an urban natural disaster, the risk of unemployment, job losses and financial constraints occurs across all occupations. The results from the research indicate that all occupations were at risk of unemployment and job losses. With broken homes and anxiety rising, financial constraints also occurred in families that did not experience any direct losses. Workers that had no damage to their homes after the earthquakes and aftershocks were still financially disadvantaged if their place of employment was located in central or east Christchurch and more so if their employment was teaching related.

Financial constraints and changes

Twenty four per cent of Junior Students and 20% of Senior Students indicated their parents/caregivers had lost income due to the earthquakes but their parents/caregivers had not lost their jobs. Financial constraints and changes in employment differed in each home environment. One student wrote how "budgets are stricter (SS29)", while another student "had to get a job to pay

for things I want (SS22)”. In two households, fathers were transferred to other branches of their employer during the working week until their place of employment was up and running again in Christchurch. One student wrote how one parent worked in the CBD and moved to another branch after the Christchurch earthquake to continue working for the company. This left the student’s father as the main caregiver.

Several students wrote how one or both of their parents were self-employed. Examples of self-employed occupations were ‘fitness instructor’, ‘painter’, and ‘hairstylist’. One student wrote there was “not enough work on because of earthquakes” while another wrote how as a family they were spending less time together because “Dad is working more hours.” Another student, with a parent as a Trade Worker, wrote how “my father is a painter so we know that soon he will be paid better than before (JS22)”.

Sixty per cent of junior students indicated that their parents had discussed leaving Christchurch. 20% of junior students whose parents had discussed leaving Christchurch permanently had actually temporarily left Christchurch after the 22 February 2011 earthquake.

Families that were disadvantaged by the earthquakes were able to apply for ‘quake break’ holidays. Two of the junior students had a charity sponsored ‘quake break’ where they travelled out of Christchurch with family members free of charge.

7.5 Displacement

Existing educational inequalities often reflect the social contours of an urban environment. Although schools make a difference, the biggest influence on educational achievement, how well a child performs in school is family background (Wilkinson and Pickett, 2009). The impacts of an urban

natural disaster on existing education inequalities or the disproportional effects of an urban natural disaster can occur within an urban environment when buildings and homes are structurally unsafe and school resources are not retrievable. Affected students may experience further disruption to their education due to displacement from their normal home and school environments. This inequality may be especially true when students living in other parts of the city have not experienced any disruption to their education.

Displacement is defined as being transferred or moved to a safe place temporarily due to damage or risk of damage at the original place. Although the original place still exists the people have moved to a new place. Analysing the changes in placement deepens the understanding of the effects of 'displacement' on educational inequalities as a whole and the education performance of individual students.

This section will re-address the role of the 'student', the 'school' and the 'state' through the displacement of the school. Qualitative responses from participants will explain the changes in the school location, changes in class times and school hours, new transport routes and changes in home work times and assistance. Finally, the role of place and what makes a school will be discussed in relation to the effects of the site-sharing agreement on teaching and learning.

Change in school location

The 'student', the 'school' and the 'state' are further analysed following the 22 February 2011 earthquake where the student, also referred to as 'the market' remains, but the school buildings are damaged as a result of this natural event. Other learning institutions in Christchurch, for example the University of Canterbury, hired and erected large marquees within the campus to operate as replacement classrooms and lecture theatres due to building damage. The University of Canterbury remained on its site and tertiary students were not displaced across the city to a new campus.

The state did not use green spaces or open sealed areas available on the school's site as places for immediate temporary classrooms (presumably because services were disrupted and recovery not available). Instead site-sharing agreements were organised by the Ministry of Education before the demolition of school buildings had commenced. This secondary school was one of six secondary schools that become 'visitors' to 'host schools' located in safer parts of the city. In the weeks between the February earthquake event and the beginning of the site-sharing agreement, permanently employed teachers were still being paid by the government and many maintained their teaching role by working from home using the internet to provide learning materials to their students. The marketability approach of maintaining Christchurch as an 'education city' was intact as host schools were informed of their role in welcoming their visiting school.

The secondary school the junior and senior students attended entered into a site-sharing agreement as a 'visiting school'. The visiting school operated from 1pm until 5.35pm, Monday to Friday (Table 18). A majority of senior students (51.1%) felt the new school site was not improving their ability to achieve (Table 21), while 27% of Juniors felt the new site improved their ability 'a little' (Table 20).

Change in school hours and class times

Under the terms of the site-sharing agreement, the visiting school's class times were held during the afternoon. Before the Christchurch earthquake, school hours were normally 8.30am until 2.45pm with lunch from 1.05 until 1.50pm. Under the site-sharing agreement, class times were reduced by 15 minutes each. Morning interval break was replaced by 'Afternoon Tea' and no lunch break was required. The visiting school's timetable was as follows:

Table 18: New class times and new timetable structure for the visiting school

Monday	Tuesday	Wednesday	Thursday	Friday
1pm Form Time	1pm Form Time	1-1.45pm Period 1	1pm Form Time	1pm Form Time
1.15 - 2pm Period 1	1.15 - 2pm Period 1	1.50 - 2.35pm Period 2	1.15 - 2pm Period 1	1.15 - 2pm Period 1
2.05 - 2.50pm Period 2	2.05 - 2.50pm Period 2	2.35-2.50pm Form Time	2.05 - 2.50pm Period 2	2.05 - 2.50pm Period 2
2.55 - 3.40pm Period 3	2.55 - 3.40pm Period 3	2.55 - 3.40pm Period 3	2.55 - 3.40pm Period 3	2.55 - 3.40pm Period 3
3.40 - 4pm Afternoon tea	3.40 - 4pm Afternoon tea	3.40-4pm Afternoon tea	3.40 - 4pm Afternoon tea	3.40 - 4pm Afternoon tea
4.00 - 4.45pm Period 4	4.00 - 4.45pm Period 4	4 - 4.45pm Period 4	4.00 - 4.45pm Period 4	4.00 - 4.45pm Period 4
4.50 - 5.35pm Period 5	4.50 - 5.35pm Period 5	4.50 - 5.35pm Period 5	4.50 - 5.35pm Period 5	4.50 - 5.35pm Period 5

A reduction of 15 minutes for each lesson adds up quickly to a large reduction of direct teaching and learning time. Student participants were adamant that the reduction in class time directly impacted on their ability to achieve. One wrote to achieve better she needed “more class time to be able to learn more (SS32)” and personally she wanted to “be able to concentrate better in the short periods (SS32).” The change in school hours also impacted on student’s ability to complete homework tasks.

The change of school hours also impacted on families and siblings. One parent wrote “schooling hours are not to the benefit of families, (and) caused separation of siblings and families (PC4)”.

While another felt the biggest impact of the earthquakes was her child “losing 1 hour per day (PC12)” in schooling and having to “travel over one hour to get to school (PC12)”. One parent described how “the quakes have disrupted our routines. I now have to leave work to ensure my child gets to the bus stop in time to get to school (PC27)”.

Teachers that were also parents of secondary school children provide another insight into balancing their working life with family after the change in teaching hours. One teacher wrote how “my kids

are fine and we have always been calm around them so aftershocks don't freak them out, but family life harder work though – due to change in my working hours (TS40)". While another teacher, who was also a parent to four school aged students that attended schools in site sharing agreements, stated very openly how the earthquakes had a "major disruption to family life and education of kids (TS48)". This teacher felt "Exhaustion - with two children on morning shifts and two children on afternoon shifts – worse year of my life (TS48)."

Transportation

Once the site-sharing arrangement began, all junior students travelled to and from school on buses. This was a change for 68% of junior students who had never travelled on a bus to their secondary school before (Table 19). All students now travelling on buses did need to walk from their home to the bus stop, but once the site sharing agreement commenced all other modes of travel stopped also. No students cycled and there was also a reduction in car travel; either as a passenger or a driver.

Before the site-sharing, students spent an average of 20 minutes travelling to school, while after the site-sharing the average time spent travelling to school on a bus was 48 minutes (this included walking to the bus stop). While some students only experienced 10 minutes extra travelling time twice a day, others experienced a total of 2 hours extra time on buses.

Table 19: Travel Mode of Students during 2011

Mode of Travel	Junior Students before 22 February 2011	Junior Students once site sharing commenced April 2011	Senior Students before 22 February 2011	Senior Students once site sharing commenced April 2011
Walk	16.0%		24.5%	0.0%
Bus	32.0%	100%	48.8%	91.0%
Cycle	12.0%		2.2%	0.0%
Car passenger	40.0%		17.8%	4.5%
Car driver	0.0%		6.7%	4.5%

Homework

The change in school hours and reduction in class times also impacted on a student's ability to complete their homework. Generally within the secondary school environment in New Zealand it is accepted that junior students complete 1 – 1.5 hours per evening and senior students complete 2-3 hours per evening. Revision or reading should be done if homework is completed early. Parents are requested to ensure that their student children have adequate time and a suitable place for study and preparation.

Table 20: Results from junior students regarding changes in school location and class times (%)

	Research questions	Not at all	A little	Sometimes	Often	A lot	All the time
1	Do you feel the earthquakes have affected your concentration levels during school time?	16.0	24.0	28.0	16.0	16.0	0.0
2	Do you feel the earthquakes have affected your concentration levels when completing homework?	28.0	16.0	32.0	4.0	20.0	0.0
3	With the change of school hours, do you find it difficult to complete your homework?	8.0	16.0	24.0	12.0	24.0	16.0
4	When you were at school on the original site (normal school hours) did your friends help you with your homework?	32.0	44.0	12.0	4.0	8.0	0.0
5	With the shift to the new school site and a change in school hours, do your friends still help you with your homework?	33.3	37.5	20.8	8.3	0.0	0.0
6	Has the move of school sites made keeping in touch with your friends more difficult?	32.0	24.0	0.0	16.0	12.0	16.0
7	Do your parents assist you in completing homework or study?	32.0	28.0	16.0	16.0	4.0	4.0
8	Has the amount of help you receive from your parents changed during this year?	48.0	4.0	28.0	12.0	4.0	4.0
9*	Do your parents wish you had normal school hours so they could assist you in completing homework or helping you with studying for tests etc.	20.8	29.2	4.2	8.3	16.7	20.8
10	With the change in school hours, do you miss out on getting help from your parents to complete your homework?	29.2	33.3	25.0	4.2	4.2	4.0
11*	Is your new school site improving your ability to achieve?	40.9	27.3	27.3	4.5	0	0

**not all of the 25 participants in this group answered every question*

Once site-sharing commenced, students were returning home in the evenings. Their education performance was already being affected by the shorter class times. Now, students had to choose to complete their homework before bedtime or complete their homework in the next morning before they left home for school. In addition to this, many of the east-Christchurch students were now living in damaged homes, some without sewerage facilities but with a portable toilet parked on the road somewhere near their home.

Although 28% junior students felt the earthquakes had sometimes affected their concentration levels during school time, this figure increased to 32% when reflecting on whether the earthquakes had affected their concentration levels when completing their homework. No junior student felt the earthquakes had affected their concentration at school or at home 'all the time'.

With the change in school hours, 24% of junior students indicated that homework completion was 'a lot' more difficult (refer to Table 20) this compares with 28.9% of senior students who felt the same (Table 21).

The role of parents and friends in assisting junior students with their homework completion is also of interest. In some home environments, involved parents assist their child in completing their homework tasks and help them prepare for school examinations. Working parents found it frustrating that they could not assist their child with their homework as they were too tired to complete it in the evening and they were at work the following morning.

Sixty eight per cent of parents had a role in assisting junior students with their homework. With the change in school hours, a quarter of junior students indicated they now miss out on getting help from their parents to complete their homework. Junior students indicated that before the site sharing, 12% of them sometimes had friends to help but now this had increased to 20.8%. With the reduction in parental help and the longer travelling time, it appears some students were now seeking out their peer group to assist them with completing homework tasks.

Table 21: Results from senior students regarding changes in school location and class times

	Research questions	Not at all	A little	Sometimes	Often	A lot	All the time
1	Do you feel the earthquakes have affected your concentration levels during school time?	4.7	16.3	25.6	30.2	18.6	4.7
2	Do you feel the earthquakes have affected your concentration levels when completing homework?	13.3	17.8	11.1	26.7	22.2	8.9
3	With the change of school hours, do you find it difficult to complete your homework?	4.4	4.4	17.8	22.2	28.9	22.2
4	When you were at school on the original site (normal school hours) did your friends help you with your homework?	13.3	37.8	33.3	6.7	8.9	0.0
5	With the shift to the new school site and a change in school hours, do your friends still help you with your homework?	20.0	33.3	31.1	8.9	4.4	2.2
6	Has the move of school sites made keeping in touch with your friends more difficult?	6.7	11.1	24.2	13.3	26.7	17.8
7	Do your parents assist you in completing homework or study?	28.9	33.3	22.2	8.9	6.7	0.0
8	Has the amount of help you receive from your parents changed during this year?	50.0	27.3	6.8	2.3	6.8	6.8
9	Do your parents wish you had normal school hours so they could assist you in completing homework or helping you with studying for tests etc.	26.7	8.9	24.4	15.6	11.1	13.3
10	With the change in school hours, do you miss out on getting help from your parents to complete your homework?	46.7	15.6	20.0	11.1	4.4	2.2
11	Is your new school site improving your ability to achieve?	51.1	26.7	13.3	6.7	2.2	0.00
12	Do you feel you are behind in your school achievement this year?	8.9	11.1	15.6	11.1	22.2	31.1
13	Do you feel you are behind in achieving internal credits this year?	11.1	15.6	13.3	17.8	13.3	28.9
14	Do you feel at risk of not achieving enough credits this year?	31.1	6.7	4.4	13.3	17.8	26.7

A considerable percentage of senior students felt they were behind in school achievement (31.1%) and behind in achieving internal credits (28.9%) and at risk of not achieving enough credits this year (26.7%). With state intervention, earthquake impaired derived grades assisted senior students to achieve levels of education attainment matched with previous years' results.

Role of place (does a school still remain the same after it moves place)

The social ecology of this school community changed following the first Canterbury earthquake where homes and land were damaged and liquefaction occurred. The first major aftershock of magnitude $M_w 6.34$, structurally damaged the school's buildings and land subsided. Fortunately, the school was closed when the earthquake struck as teachers were attending a Post Primary Teachers Stop Work Meeting at the Christchurch Town Hall. No staff, teachers or students from this school lost their life as a result of the 22 February 2011 event. This school site remained closed for teaching and learning purposes for the rest of the school year which ended in December 2011. This school entered into a site-sharing agreement which commenced in March 2011 for the remainder of the school year. School hours changed from the normal 8.30am until 3pm to an afternoon start of 1pm until 5.35pm, Monday to Friday. On the original school site, school buildings were demolished during 2011 and pre-fabricated school rooms were built on site. School re-opened back on its original site, almost one year later in February 2012.

During 2011, the student participants missed their old school site. Every student wrote at least one sentence about what they missed about the original school site emphasising the role of place and how the student's felt 'dis-placed' once site sharing commenced. Qualitative responses from students range describe how they missed "having a school for ourselves (SS29)", how they missed "the main block building (SS19)", and how they missed the "grass, trees, flowers (SS12)". Students missed the school's location and proximity to their home. "I could bike to school (SS12)" wrote one student, while another wrote how school was "easy to travel to (SS21)". The original school buildings on the original site provided a sense of belonging, one student wrote "how pretty it was and feeling like you belonged (SS43)".

7.6 Health and Wellbeing

The health and wellbeing of our participants is viewed through direct effects resulting from the change of school hours and effects of the earthquakes and aftershocks on their anxiety levels. This section examines the basic needs of exercise, food and sleep. Shelter is not discussed here as there was no assessment of homes prior to the earthquakes, but participants that continued to reside in damaged homes will be mentioned and those that describe their poor state of health due to inhaling dry silt liquefaction ejecta are also included. The aim of this section is to focus on three areas of change that participants raised qualitatively in their questionnaire which occurred directly due to the change in school hours. Firstly, the unavailability of after school sport, then the change in family meal times and sleeping patterns. Finally all participants assessed their own state of anxiety and health at the time of completing the questionnaire. The limitation of self-assessment is this is not an indicator of its relevance to health and wellbeing, but it is of interest when correlated with other qualitative and quantitative responses throughout individual questionnaires. Sadly, only one of our student participants indicated their health as 'excellent'.

Unavailability of after school sport

Secondary schools provide many opportunities for students to be involved in sports. Some schools provide over thirty different sports options including athletics, golf, rowing, rugby and water-polo. With the assistance and organisation of parents and teachers, students can represent their school in inter-school competitions on Wednesday afternoons. Training for these tournaments is generally held during other afternoons on a school day.

The earthquakes and aftershocks damaged sporting facilities in many parts of east-Christchurch causing organisations to 're-think' the use of open green spaces in other parts of the city. School

playgrounds that lay idle after school hours and over the weekends could be used by sporting clubs to maintain health and wellbeing of club participants. Secondary schools without land damage could now hold inter-school afterschool sport on a more regular basis than prior to the earthquakes. But students that became part of a site-sharing agreement as visitors, could not “attend due to school hours changing (SS28)”. One student “used to play indoor netball but now clashes with school (SS39)” while another commented “because of the change in school hours, I now can’t play my sports I used to play (SS41)”. One participant wrote she did “not have enough time (SS29)” and even if she had time available, the “silt caused worse asthma (SS29)” indicating another impact of the earthquakes: the silt particles from liquefaction that lay beneath homes with wooden floorboards and on the ground surface surrounding residential areas contributing towards respiratory illnesses especially on windy days.

Two rivers flow through the city of Christchurch. Following the February earthquake, the Avon River became polluted with raw sewage and water activities were disbanded for eight months due to health reasons. Student participants that were also rowers commented they were actually rowing less due to the pollution. Another participant stated that she was exercising less in the evenings and weekends because ““I don't like being out as much (SS8)” indicating the anxiety and stress associated with her previous earthquake experiences. Overall, 52% of junior students and 51% of senior students stated they were exercising or participating in sports less in 2011 than the year before.

Change in meal times and sleeping patterns

Before the 22 February 2011 earthquake, school started at 8.30am and the shortest travel distance of our student participants was 2 minutes, therefore students may have been getting out of bed at the latest time of 8am. Once the site-sharing agreement commenced, sleeping patterns altered for

a majority of our students with 60% of junior students and 73% of senior students still in bed at 8.30am. The average time our students got out of bed was 9am allowing several hours of homework and study time before travelling to school at midday.

Parents commented on the change in sleeping hours of their children with regards to the change of school hours and bedrooms due to house damage. One parent noticed “bad behaviour from children due to lack of sleep (PC21)” because “youngest can’t sleep without eldest child in room, eldest child at afternoon school and is not ready for bed till later but can’t sleep in the next morning either (PC21).” One teacher and mother stated how “our 6 year old is still sleeping in our room, in his own bed, as a result of the earthquake. His bed in his own room is right by the chimney, the top half of which came through the ceiling in the February quake (TS54)”. Changes in the home environment contributed towards further stress of family members.

Anxiety

Participants were feeling levels of anxiety due to various reasons resulting from the effects of the earthquakes and aftershocks. Some felt anxiety following a large aftershock or earthquake. While others felt their anxiety levels were recovering from the effects of ground movement but were once again on the increase due to the communication process with government agencies and insurance companies regarding the repair of their family home.

Parents and caregivers were directly questioned regarding their anxiety levels following a large aftershock. All responded indicating some level of anxiety with 34% indicating they ‘often’ felt anxious and 28% indicating they felt ‘a lot’ of anxiety following a large earthquake or aftershock. While the other adult group of teachers and staff, 9% stated they felt no levels of anxiety when feeling an earthquake or aftershock. However, this group of teachers and staff had the widest range of anxiety with 44% experiencing ‘a lot’ of anxiety following a large earthquake or aftershock. This

same group of teachers, stating they were experiencing 'a lot' of anxiety, also experienced the full energy of the 22 February 2011 earthquake as they were within the Town Hall complex and walked through the central urban disaster zone.

Reflection of your own 'State of Health'

Participants completed a 'self-assessment' on their own state of health. The limitation of this 'self-reflection' is a lack of data on our participant's state of health prior to 2010. However, since only one student described their state of health as 'excellent' it is of interest to include this part of the questionnaire in this thesis (refer to Table 22).

The questionnaires of participants that self-assessed their health as 'poor' were further reviewed for any correlation with either their earthquake experiences on the 22 February 2011 or their comments regarding the impacts of the earthquakes. One Year 9 Junior Student (JS13) experienced the 4 September 2010 earthquake at home with family members. Their family's home is not located within the red zone. This student experienced the 22 February 2011 earthquake in the school library and describes seeing "books falling off the shelves, the loud rumbling, cracks appearing in the walls/ceiling, liquefaction coming up from the ground, the shocking silence afterwards (JS13)". Neither parents lost their job or income as a result of the earthquakes, but both have discussed leaving Christchurch to live elsewhere. The student's family temporarily moved out of Christchurch after the 22 February 2011 earthquake. This student used to walk 20 minutes to school but now buses 30 minutes to school. This student often misses the old school and thinks the new school "has too many people". On the 13 June 2011, this student "felt scared, not knowing how bad it was. I remember that people were panicking and some in tears (JS13)". This student felt it difficult to complete homework 'all the time'. This student had five or more days off school due to sickness in 2011 and had more days off in 2011 than in 2010. This student is also exercising less in 2011 than in

2010. When this student wakes during the night because of an aftershock this student feels tired the next day ‘all the time’. This student feels anxious when experiencing a large earthquake or aftershock ‘all the time’. This student is not getting used to the earthquakes and aftershocks and is feeling less healthy. This student’s honesty in completing this questionnaire in their own time without incentives provides value to these research results.

Table 22: Current state of health

Participant group	Number of participants	Current State of Health				
		Excellent	Very Good	Good	Fair	Poor
Year 9	18		6 (33.3%)	8 (44.4%)	3 (16.7%)	1 (5.6%)
Year 10	7		3 (42.9%)	2 (28.5%)	1 (14.3%)	1 (14.3%)
Year 11	13		4 (30.8%)	5 (38.4%)	3 (23.1%)	1 (7.7%)
Year 12	25	1 (4.0%)	5 (20.0%)	12 (48.0%)	7 (28.0%)	
Year 13	7		1 (14.3%)	4 (57.1%)	2 (28.6%)	
Parents and Caregivers	29	3 (10.4%)	12 (41.4%)	11 (37.9%)	2 (6.9%)	1 (3.4%)
Teachers and Staff	55	3 (5.5%)	12 (22.2%)	28 (51.9%)	9 (16.7%)	2 (3.7%)

One Year 10 Student (JS21), who describes their health as ‘poor’, experienced the 4 September 2010 and the 22 February 2011 earthquakes at home. This student wrote that to achieve better they wanted to “stay at the same school, normal school hours (JS21)”. Like our Year 9 student, this student was also exercising less and had more sick days during 2011 than the previous year.

One Year 11 student (SS02) was staying with friends on 4 September 2010 but at a suburban mall on 22 February 2011. This student describes seeing “people, water, blood, fire, cars” as their experience of this day. Both of this student’s parents have lost income due to the earthquakes and they have discussed leaving Christchurch. This student, like our Year 9 student, temporarily moved out of Christchurch after the 22 February 2011. Also, this student used to walk 15 minutes to school

and now buses 30 minutes. On the 13 June 2011 this student felt “confused (SS02)”. With regards to their school achievement and credits towards achieving level 1, this student ‘often’ felt at risk of not achieving enough credits in 2011. Again, this student has been sick for more than 5 days this year. This student has not got used to the aftershocks and feels less healthy ‘all the time’ than before the earthquakes started.

One parent (PC14) that stated her health as ‘poor’ is living within the red zone. As mentioned earlier under ‘home environment’, the greater Christchurch region was categorised into four zones with red indicating the land is unlikely to be able to be rebuilt on for a considerable period of time. For people who owned property in the red zones, the state would be making an offer to purchase the property or land. She wrote “life is very uncertain. We are in the red zone, don’t know where we are going to+ move to. We were told emergency repairs are free but now if it goes over certain % will be taken out of settlement. Was nearly mortgage free – now have to look at a bigger mortgage if stay in Christchurch (PC14)”. She was at home on 22 February 2011 and describes “the whole house shaking violently, water coming out of the ground and rising to main doors of house. Objects falling to the ground. Children crying. I could not stand, lost balance and could not get up due to house piles collapsing (PC14)”. As a family, they have lost income and have considered leaving Christchurch permanently because of the earthquakes.

Two teachers that describe their health as ‘poor’ (TS20 and TS48) were both in the CBD on 22 February 2011. One teacher writes the impacts of the earthquakes have affected her health due to a change in her home environment “we now live in an extended family – 4 people (including a small child) in a 2 people home (TS20)” and air quality with “silt dust continues to blow, rising damp in the house”. Overall, this teacher felt “life is harder now, redundancies and CAPNA (TS20)”. Our other teacher participant is mentioned earlier as the earthquakes have had a “major disruption to family

life and education of kids (TS48)” with four children now on site sharing schools: two in morning and two in afternoon.

The roles within families also change. Teenage secondary school children may be deeply concerned for other members of their family following an earthquake or major aftershock. The teenager steps up and becomes the head of the family in finding other family members on the way home. Young adults are aware of the coping mechanisms of their parents and parents already under stress require family support.

As the writer, it is overwhelming at times to read the research questionnaires and synthesise responses into a quality snapshot of how these natural events impacted on the lives of this school community over such a short period of time.

7.7 Conclusion

The Canterbury earthquakes and aftershocks changed the lives of the research participants. The aim of this chapter was to analyse the research results from our voluntary participants through four geographical perspectives: the spatial effects, socio-economic impacts, displacement, and health and wellbeing. Where the previous chapter analysed the education performance across greater Christchurch schools, this chapter tells the story of the participants’ lives as they coped with the impacts of the earthquakes and aftershocks in Christchurch.

The participants are students, teachers and staff, parents and caregivers, who voluntarily contributed to this research. The three education inputs discussed in Chapter 2, took a different shape as the state intervened and displaced this secondary school to a safer location: the teachers

and the students moved while the school buildings were demolished and a new temporary school was established on the original school site.

This school community includes primary victims who have directly experienced physical, material, personal or financial losses, and secondary victims who live in Christchurch, but sustained no personal injuries or damages (Bolin, 1985). The ability of each individual to cope with the earthquakes and aftershocks is connected to where they were, what they saw and what happened next, where their home is located and where their place of income is situated. Because of building damage, many households had a reduction in their income due to job losses and financial constraints. Families with damaged homes and liquefaction on their land needed to re-locate temporarily or financially repair their home quickly. The secondary school remained as a school without functioning buildings so students were transported and displaced to a new school location in a safer part of Christchurch. As a visiting school, class times were reduced, school hours changed and students arrived home in the evening time. The change in school hours impacted on the exercise, meal times and sleeping times of our student participants. The health and well-being of our parent participants indicated that anxiety and stress levels remained high after the ground stopped shaking due to communication with insurance companies, the state, and the Earthquake Commission. Anxiety levels and the health and wellbeing of our participants are connected with their earthquake experiences, their family's socio-economic impacts from the earthquakes, and the displacement of their school.

Due to the Human Ethics Committee approval of this research, this secondary school cannot be named and the education performance of students cannot be detailed in this chapter. I have attempted to complete a snapshot of the Year 2011 where the qualitative and quantitative results of

a small community of primary and secondary victims are representative of thousands of others within greater Christchurch.

Chapter 8: Conclusion

8.1 Introduction

This chapter concludes the thesis and summarises the findings that have been presented throughout this research. First, the aim and objectives that were stated in Chapter 1 are discussed. The second section summarises the key findings that have emerged from this research under a sub heading of each objective. The third section forms the foundation of this chapter and under each objective; a discussion section will relate the key findings to previous research. The fourth section discusses limitations of the research. The fifth section identifies possibilities for future research stemming from this thesis. Finally, a concluding statement completes the research.

8.2 Aim and Objectives

The overall aim of this research was to investigate the impacts of the 2010 and 2011 Canterbury earthquakes on educational inequalities and variations in academic achievement between Christchurch secondary schools through a geographical perspective.

The objectives were:

1. To analyse the effects of the Canterbury earthquakes on existing educational inequalities between Christchurch secondary schools.
2. To examine the impacts of the earthquakes on a sample school community who were displaced (to another school) because of the Christchurch earthquake of 22 February 2011.

3. To record and evaluate state interventions into secondary school education in the greater Christchurch region during 2011.

The objectives were used to structure the chapters within this thesis. The first objective was met through Chapters 2, 3, 4, 5 and 6. Chapter 2 provided the reader with a literature review of the traditional and current explanations of educational inequalities in modern societies. Chapter 3 researched the impacts of urban natural disasters in modern societies on education and educational inequalities. Chapter 4 provided a contextual background of the city of Christchurch and the history of residential settlement. This chapter also included information on the provision of educational services that resulted in residential segregation which helped compound inequalities in performance between schools. Chapter 5 detailed the methodology used to achieve this objective. Chapter 6 analysed the educational performance of greater Christchurch secondary schools through examining each school's National Certificate of Educational Achievement from 2009 through to 2012 which represents the years before, during and after the Canterbury earthquakes.

The second objective was met through Chapters 3, 4, 5 and 7. Chapter 4 provided the physical geography of Christchurch along with the history of natural events in the region. Chapter 5 detailed the methodology used to achieve approval of the University of Canterbury Human Ethics Committee to research one school community displaced due to the earthquakes. Chapter 7 takes the reader through the experiences of the participants from their first earthquake on 4 September 2010 until one year later through four geographical perspectives of the spatial effects, the socio-economic impacts, displacement and health and wellbeing. Chapter 7 is a story, a record, of the participants' lives as they coped with the impacts of a local natural disaster.

The third objective was met through Chapters 2, 4 and 6, and the impacts were further described by participants in Chapters 7. As with the first objective, Chapter 2 also provides the reader with a

history of state intervention into education and compares educational services between the United Kingdom, the United States of America and New Zealand with a specific focus on the impacts of neoliberal education reforms. Chapter 4 includes the impacts of the Canterbury earthquakes on greater Christchurch secondary schools and the state's four interventions into the education of greater Christchurch region. Chapter 6 evaluates the overall impacts of these interventions including site sharing agreements, and the extent to which these affected patterns of educational inequality.

8.3 Key Findings

Under each objective there is a summary of the key findings. These are discussed further in the next section of the chapter.

Thesis objective 1: Educational inequalities between Christchurch secondary schools

Analysis of NCEA results from 2009-2012 raised six key findings regarding the changes in education performance between greater Christchurch secondary schools. The final key finding requires further research and is discussed in the next section. The six key findings are:

1. Educational Inequalities existed in 2009, prior to the earthquakes, between Christchurch secondary schools.

National Certificate of Educational Achievement (NCEA) level 1-3 results from 2009 show there is a positive relationship between decile ratings and school differences in achievement. 2009 NCEA levels 1-3 results show the lowest decile group (decile 2 as there are no decile 1 secondary schools in the greater Christchurch region) comprised of two east Christchurch schools with the lowest NCEA results.

2. Disproportionate effects of the Canterbury Earthquake of 4 September 2010

When secondary schools were grouped by their decile ratings and the 2010 NCEA levels 1-3 results were compared to the previous year, as a percentage of change, the average change was negative indicating an overall lower achievement across all secondary schools in the greater Christchurch region. Lower decile schools had much lower levels of achievement in 2010 than 2009, indicating a disproportionate effect of the Canterbury Earthquake on lower SES groups.

3. The 'school effects' within each lower decile school during 2011 contributed to higher student achievement when compared to 2009.

The 'school effects' integrates the context, composition and social capital of a school. Low decile schools (rated deciles 2, 3 and 4) were able to improve their 2011 NCEA levels 1-3 results from 2009. This indicates each low SES school, each with its distinctive social environment, was able to influence the educational performance of senior students through two processes: the state's earthquake impaired derived grade process administered by each school, and teaching techniques in engaging student's learning. The 'school effects' within low SES schools during 2011 assisted senior students to achieve NCEA following the Christchurch earthquake of 22 February 2011.

4. NCEA 2012 levels 1-3 results indicate high decile schools have been able to recover their education performance rates of 2009.

When the 2012 NCEA levels 1-3 results of four decile 10 schools, as one group, are compared with their 2009 NCEA levels 1-3 results, as a percentage of change, the result is 0.00%. This indicates that in 2012 the four independent (private) decile 10 schools in the greater Christchurch region have regained their high achievement levels from 2009 (prior to the earthquakes).

5. Social gradient in school academic performance was slightly weaker in 2012 than 2009

When thirty four secondary schools in the greater Christchurch region were grouped by their decile rating and their 2012 NCEA levels 1-3 performance was compared to 2009 NCEA results, the regression coefficient indicated a negative relationship between percentage of change and school decile rating, meaning lower decile have fared marginally better in their NCEA achievement in 2012 than 2009. Therefore, the social gradient in NCEA achievement was slightly weaker in 2012 than 2009 (the social gradient is illustrated on each graph as a linear trend line).

6. NCEA 2012 levels 1-3 results indicate some schools have not been able to recover their education performance rates of 2009.

When the 2012 NCEA levels 1-3 results of decile three and decile four schools are compared with their 2009 NCEA results, as a percentage of change, the average results are negative indicating their NCEA results are lower in 2012 than 2009. There are also a few individual schools in higher decile ratings that are performing lower in 2012 than 2009. This key finding requires further research into the influence of the 'school effects' following the Canterbury earthquakes on these specific individual school environments.

Thesis Objective 2: Impacts of the earthquakes on one displaced school community

The impacts of the Canterbury earthquakes were researched at one Christchurch secondary school which was displaced to another school because of earthquake damage to land and buildings following the Christchurch earthquake on 22 February 2011. Analysis of the research raised six key findings, some of which require further research and are discussed later in the chapter. The key findings are:

1. Re-definition of 'primary' and 'secondary' victims

Bolin (1985) observed that there were two broad categories of victims in a disaster; primary victims who directly experienced physical, material, or personal losses, and secondary victims who live in the affected area, but sustain no injuries or damages. This study found that secondary victims, who had their place of work damaged due to its location relative to the earthquake's epicentre and subsequently lost income, indirectly became primary victims, even though they had originally not directly experienced any physical, material or personal losses. On-going financial hardship had affected the health of the adults in the household and any change to the home environment effects school age children's ability to study and learn effectively.

2. The significance of the spatial impacts from the Canterbury Earthquakes

None of the research participants had experienced an earthquake of the same magnitude as the first seismic event on 4 September 2010. Only one participant was in the same location for the three major seismic events in 2010 and 2011. All other participants experienced these three natural events at more than one location, with different people and with differing responsibilities. Depending on location, members of the same family had different experiences in what they felt and saw in others around them. Together, as a family they had different recounts of their experiences on those days. This fact is significant as one household of adults and school-aged children, living in a location cannot be categorised or presumed to have experienced the Canterbury earthquakes in the same way. The spatial impacts of the earthquakes are also significant for future research into the effects of the Canterbury earthquakes on the health and wellbeing of its residents.

3. The significance in the range of socio-economic impacts

Following the Canterbury earthquakes, there was a disproportionate socio-economic effect within the urban environment of Christchurch. Earthquake damage to land and buildings did not occur in

all parts of the city. Residential land was divided into four groups with the state making an offer to purchase property or land in the 'Red zone'. As at 17 December 2012, 6,391 red zoned properties have signed a sale and purchase agreements with the State (www.cera.govt.nz). This has led to a migration of households out of east-Christchurch and led to increased school rolls in other parts of the region. Some households in properties that were not zoned 'red' have remained living in damaged homes waiting for their home to be repaired.

4. The impacts of displacement

Prior to the Canterbury earthquakes, residential segregation and school enrolment zones were strong factors influencing educational inequalities and achievement between Christchurch secondary schools. School site sharing agreements resulted in the transportation of visitor school students to host schools where both host and visiting students experienced shorter school times. School hours were in the afternoons and students arrived home in the evenings. The new school hours were not to the benefit of many families; working parents found it difficult to leave their child at home while they went to work each morning and many younger siblings felt separated. To resolve this, many parents and caregivers travelled home at lunchtime to help organise their child for school or accompany them to the bus stop. Change in school hours also impacted on a student's ability to complete their homework. Students missed their original school site emphasising the role of place, identity, and a sense of belonging once school site sharing commenced.

5. Health and Wellbeing

The research into health and wellbeing took place during October 2011. Research results indicated a range of factors; the unavailability of after school sport, change in meal times and sleeping patterns, uncertainty about their future plans, anxiety and stress levels, all affected the health and wellbeing of the student research participants. The research results from adult participants indicated some

households were living in the red zone and there was uncertainty about future living arrangements. The health and wellbeing of the parent participants indicated that anxiety and stress levels remained high after the ground stopped shaking due to communication with insurance companies, the State, and the Earthquake Commission. Also, participants wrote about their poor health due to respiratory illnesses from inhaling dry silt liquefaction ejecta. Silt liquefaction ejecta can settle around homes and around piles of older homes and the dust can seep through floorboards of damaged homes where families are still residing. Respiratory illnesses from inhaling dry silt liquefaction ejecta can also be an environmental justice matter as many of these homes are built on drained wetlands.

6. Environment Justice of 'housing affordability' - building low SES homes on drained wetlands.

The Canterbury earthquakes devastated coastal communities with serious flooding from soil liquefaction. Some of the survey participants were living in seriously damaged homes on sunken land. Some of this land area was reclaimed natural wetlands. From the 1990s, natural wetlands have been the sites for housing developments under the name of 'housing affordability'. Now, many of these homes have been red zoned.

The State has intervened through purchasing properties, but the experience and disruption to residents has been traumatic. Where previously, drained wetlands were redeveloped for residential housing, using the urban natural disaster of the Canterbury earthquakes as an example, where should low SES housing in the name of 'housing affordability' now be located?

Thesis Objective 3: State interventions into secondary school education during 2011

Following the Christchurch earthquake of 22 February 2011, the state immediately intervened into the education of the region by arranging the site-sharing of schools, providing free bus transportation of displaced school students, and amending the Education Act to enable the interventions to occur. When this thesis proposal was approved, the state's intervention of 'Earthquake Impaired Derived Grades' had not been announced (the process is detailed as Appendix 11). However, proceeding with this thesis, with the same hypothesis, has resulted with the following key findings:

1. The New Zealand Qualification Authority (NZQA) 'Earthquake Impaired Derived Grade' process and educational achievement

This state intervention raised NCEA achievement in 2011 when compared with the previous two years, 'masking' the effects of the Christchurch earthquake on education inequalities and achievement, and corrected the impacts of the Canterbury earthquake of September 2010. The 2011 NCEA levels 1-3 average results from the Canterbury region (includes all greater Christchurch secondary schools) was higher than the overall New Zealand average.

2. Site sharing schools and educational achievement during 2011

When the 2011 NCEA results from site sharing schools (host and visitors) were compared against non-site sharing schools, the Canterbury average, and New Zealand average, it was found that non site sharing schools achieved the highest results in NCEA level 1 when compared to the other three groups. Host schools may have had achieved lower levels of NCEA achievement in 2011.

8.4 Discussion

This section relates the key findings to previous research on the impacts of urban natural disasters on educational inequalities. Again, the format of this section will be under the sub headings of the three objectives of this thesis:

Thesis Objective 1

Educational inequalities existed between greater Christchurch secondary schools throughout our research years from 2009 until 2012. National Certificate of Educational Achievement (NCEA) results indicates the social gradient of achievement strengthened in 2010 (when compared to 2009), but was slightly weaker in 2012 (than 2009). In 2012, higher decile schools have recovered their high academic performance from 2009, while some schools, particularly decile 3 and 4 schools have not. A school is also a community and its ability to recover from a disaster can be attributed to disaster resiliency and social capital (Rivera and Settembrino, 2013; Kapucu, Hawkins, Rivera, 2013).

Previous research into educational inequalities following an urban natural disaster, found no literature on the disproportionate effects of a natural event on existing educational inequalities where education performance was compared between schools prior to and following the urban natural disaster. There existed literature on post-disaster education systems (Akers, 2012) and examples of educational inequalities (Milne, 1977; Hardy, 2006; Akers, 2012) but nothing of a similar nature to the objectives of this thesis.

High decile schools are predicted to continue their high achievement results in NCEA. Once the 2013 census statistics are available, the Education Review Office will re-calculate the decile rating of each New Zealand school and there will be an adjustment of schools within each decile group. The positive relationship between decile rating and NCEA achievement is expected to continue.

Thesis Objective 2:

One Christchurch secondary school community provided rich and relevant data into how the Canterbury earthquakes impacted on their lives. Research was voluntary and participants completed questionnaires during October 2011. None of the participants had experienced an earthquake of the same or greater magnitude as the first seismic event on 4 September 2010. This earthquake lasted about 40 seconds and caused widespread damage and power outages. Sewers and water lines were broken. Liquefaction occurred throughout Christchurch with greater extent in the eastern and coastal communities. Many of the participants moved out of their home temporarily until services were restored. In September 2010, senior students were sitting school examinations and in November 2010 they sat their external NCEA examinations. There was no process available for students to apply for an earthquake impaired derived grade. When the 2010 NCEA levels 1-3 results, from each secondary school, as a percentage of change from 2009, were combined under decile ratings, the results indicated an overall lower achievement across all secondary schools when compared to the previous year.

2011 was a disruptive year for the research participants. Research results from the secondary school community provided data on the impacts of the Christchurch earthquake of 22 February 2011. This day was not a normal school day and many students were unsupervised at the time of the earthquake which resulted in family members experiencing different levels of devastation which classifying some as primary victims. The immediate socio-economic impacts included loss of employment and financial restraints. Displacement of the school during 2011, along with change of school times impacted on families. The health and wellbeing of the participants indicated levels of anxiety, stress and uncertainty about their future. State interventions into the education of

Canterbury secondary school students masked the effects of this 2011 Christchurch earthquake on education inequalities and corrected the impacts of the Canterbury earthquake of 2010.

Thesis Objective 3:

Following the Christchurch earthquake of 22 February 2011, the state intervened into the education of the region through four processes: the Education Act of 1989 was reviewed and temporarily amended, site-sharing of schools was put in place, displaced students were provided free bus transportation to their new host school, and a plan was developed for student assessment through establishing an earthquake impaired derived grade. These interventions were effective during 2011. The impacts of the state interventions were evident in NCEA achievement results. State interventions were in place during 2011 only and the effects appear to be temporary as evidenced by the NCEA 2012 results being similar to the NCEA 2009 results.

In New Zealand, the State's intervention into education following the 22 February 2011 earthquake is the 'how' of the process but 'why?' did the state intervene is worth discussing. Research into the history of state intervention found it first occurred following the Second World War to provide a better educated and healthier workforce. Prior to the Second World War, children received an education according to their parent's wealth and social class (Chapman, 1986). Politically, this state intervention following the Second World War fitted well with the economic doctrines of John Maynard Keynes and the development of the Welfare State (Pinch, 1997). But following the introduction of neoliberal policies and education reforms of the 1980s, the state interventions in 2011 did not fit well with the 'rule of the market' and 'individual responsibility'. However, interventions maintained the 'educational marketability' of the region and this is also predicted to provide a healthier workforce now in training for the Christchurch rebuild (van der Steeg, 2005).

8.5 Limitations

One limitation of my research into the school community, displaced to another school due to the February 2011 earthquake, was the outcome of the approval process by the University of Canterbury Human Ethics Committee. This process limited the number of participants and reduced the planned sample size. Also, I was not able to compare the questionnaire responses with individual NCEA achievement results due to the confidentiality of this research. Unfortunately, I have not been able to include all their responses into this thesis.

The second limitation was the National Certificate of Achievement results for 2011 did not reflect the true levels of educational inequalities between secondary schools in the greater Christchurch region. The State's interventions into the earthquake impaired derived grades process weakened the existing positive relationship between decile rating and achievement during 2011. This occurred because all students had the opportunity of achieving a higher grade. High decile schools with high achieving students could maintain high levels in achievement, while low decile schools with disadvantaged students now had the opportunity to raise student achievement. The derived grade was taken from the student's school examination result and if a student did not pass that exam they had the opportunity to sit it again in the external NCEA examinations in November 2011. Students that passed their school examinations could aim for a higher external NCEA examination result in November 2011. Students that passed three of their five school examinations, for example, could now focus on achieving all five external examinations by just studying the two subjects they failed during the school examinations. The higher of the two; school examination or NCEA external examination was the final NCEA grade for 2011. The earthquake impaired derived grade process had a dual role to assist student achievement due to loss of school time and provide a final mark for

each subject should another major earthquake or aftershock occur during the NCEA examinations in November 2011.

8.6 Future research possibilities

There are many possibilities for future research from this thesis. There is a large body of information on the increasing levels of social inequalities following urban natural disasters. There are a few articles relating to educational inequalities and performance, but no research could be found into the disproportionate effects of these natural events on existing educational inequalities where education performance was compared between schools prior to and following the natural events. Areas of future research possibilities are now detailed under the 'lag effects' of the Canterbury earthquakes on people and communities.

Research into the 'lag effects' from the Canterbury earthquakes on school age children

State interventions in 2011 'masked' the effects of the Christchurch Earthquake of 22 February 2011 on the education inequalities and NCEA achievement results of secondary school students in the greater Christchurch region. The 2012 NCEA results show educational inequalities between schools are now similar to 2009 NCEA results. Since there was a lack of research literature on the effects of an urban natural disaster on existing educational inequalities within a modern society, it is suggested that further research possibilities should cover the 'lag effects' of an urban natural disaster. Areas of research could include:

1. What are the 'lag effects' of the Canterbury earthquakes on the NCEA achievement of post-disaster survivors?

2. Did the 2011 NZQA earthquake impaired derived grades assess NCEA level 3 students to achieve higher than their natural ability and therefore expose them to early failure in a tertiary environment? Appendix 13 has NCEA level 3 comparative data between 2011 and 2012 results.
3. At what age is a child's education most affected by an urban natural disaster, like the Canterbury earthquakes?
4. From an education perspective, are 17 year olds less affected by an urban natural disaster than 12 year olds or 5 year olds? If so, what support systems do our secondary schools need in place in 5 or 10 years' time to assist students to study and learn to their potential?
5. When young primary victims of the Canterbury earthquakes reach Year 11 (15-16 years of age) and their levels of stress and anxiety are still present, what can assist them in the school environment to study and learn successfully to achieve NCEA to their cognitive ability?
6. Is there a difference in the educational achievement of students that remained in Christchurch when compared to those that migrated out of Christchurch following the earthquakes?
7. School site sharing may influence further lower levels of NCEA achievement in 2012 through to 2015. This may occur, as students in host and visitor schools had reduced school hours and teaching times during 2011, therefore, a Year 9 student in 2011 will be completing their education in 2015 as Year 13 student, but did not receive enough learning in Year 9 to achieve to their potential in Years 11-13.

Comparative studies could include research into school age children during wartime bombardment and the exodus of Darwin residents following Cyclone Tracy. John's research (1941) suggests "some

of the worst effects on children could have resulted from observing the reactions of over-anxious and hysterical adults” (Milne, 1977 pp.55). To provide any meaningful New Zealand research would require a gathering of information not only from east Christchurch schools but also the schools that students moved to after the Canterbury earthquakes.

8.7 Concluding statement

This thesis has sought to investigate the impacts of urban natural disasters on people and places in modern societies, with a focus on the impacts of the Canterbury earthquakes on the existing educational inequalities between secondary schools in the greater Christchurch region. Educational inequalities were explained through three educational inputs of the student, the school and the state. Educational outputs are examination results. The earthquakes and aftershocks that devastated much of the city of Christchurch present a unique opportunity for academics, policy writers, non-governmental organisations, and engineers. There was no previous evidence to suggest an earthquake would occur within the city limits. There is now a city full of potential research and potential research participants. One future research possibility consists of researching the ‘lag effects’ of the Canterbury earthquakes on school-age children which may provide an understanding of their needs as they study and learn towards achieving their potential now and in their future, and the research results may provide empirical evidence to other modern societies around the world when an urban natural disaster occurs in their city.

References

- Abbott, P. L., 2006. *Natural Disasters*. 5th edition. New York: McGraw Hill
- Adams, G., 2008. Commemorating Brown. In: G. Adams, M. Biernat, N. R. Branscombe, C. S. Crandall, L. S. Wrightsman, eds. *Commemorating Brown: The Social Psychology of Racism and Discrimination*. Washington: American Psychological Association, pp.3-23.
- Agnew, J., 1987. *Place and Politics*. Mass.: Allen & Unwin.
- Akers, J. M., 2012. Separate and Unequal: The Consumption of Public Education in Post-Katrina New Orleans. *International Journal of Urban and Regional Research*. Volume 36, Issue 1, pp.29-48
- Aplin, G. et al., 2003. *Global Environmental Crises*. 2nd ed. Melbourne: Oxford University Press.
- Attewell, P., 2010. Education and Inequality in a Global Context. In: P. Attewell and K. S. Newman, eds. *Growing Gaps Educational Inequality Around the World*. Oxford: University Press, pp.3-32.
- Ball, S. J., 1993. Education markets, choice and social class: The market as a class strategy in the UK and the US. *British Journal of Sociology of Education*, 14, pp.3-19.
- Beare, H., 1980. Cyclone Tracy and the Darwin Educators: A Case in Crisis Management.
- Benn, M., and Millar, F., 2006. *A Comprehensive Future: Quality and education for all our children*. London: Compass.
- Beveridge Report, 1942. [online]
Available from <<http://www.rss.org.uk/site/cms/contentviewarticle.asp?article=1246>>
[Accessed 19 June 2012]
- Blake, E. S. and Gibney, E. J., 2011. *The Deadliest, Costliest, and most intense United States tropical cyclones from 1851 to 2010 (and other frequent requested hurricane facts)*. NOAA Technical Memorandum NWS NHC-6 [online]
Available from <<http://www.nhc.noaa.gov/dcmi.shtml>> [Accessed 22 May 2012]
- Blumenthal, D., 1967. Coleman Report Brings Revolution, No Solution. A Blueprint for Urban Education. *The Harvard Crimson*. [online]
Available from <<http://www.thecrimson.com/article/1967/11/28/coleman-report-brings-revolution-no-solution/>> [Accessed 26 April 2012]
- Bolin, R., 1985. Disaster characteristics and psychosocial impacts. In: B. Sowder, ed. *Disasters and Mental Health: Selected Contemporary Perspectives*. Rockville, MD: National Institute of Mental Health; pp.3-28.

- Bondi, L., 1987. Education, social needs and resource allocation: a study of primary schools in Manchester. *Area*, 19(4), pp.333-343.
- Borman, G. D. and Dowling, M., 2010. Schools and Inequality: A Multilevel Analysis of Coleman's Equality of Educational Opportunity Data. *Teachers College Record*, 112(5), pp.1201-1246.
- Bourdieu, P. (1973). Knowledge, Education and cultural change. In R. Brown, (ed.) *Knowledge, Education and Cultural Change*. London: Tavistock
- Bowles, S. and Gintis, H., 1972. I.Q. in the Class Structure. *Social Policy* 3 (Nov-Dec), pp.65-96.
- Bowles, S. and Gintis, H., 1976. *Schooling in Capitalist America*. London: Routledge & Kegan Paul.
- Boyd, W. and King, E. J., 1972. *The History of Western Education*. 10th edition. London: Adam & Charles Black.
- Bradford, M., 1989. Educational Change in the City. In: D. T. Herbert and D. M. Smith, eds. *Social Problems and the City: New Perspectives*. New York: Oxford University Press. pp.142-158
- Brooking, K., 2005. Boards of trustees' selection of primary school principals in New Zealand. *Delta* 57 (1 & 2), pp.117-140.
- Brown, L. J. and J. H. Weeber, 1992. *Geology of the Christchurch Urban Area*. Lower Hutt: Institute of Geological & Nuclear Sciences Ltd
- Bullard, R. D. and Wright, B., 2009. *Race, Place and Environmental Justice after Hurricane Katrina: Struggles to Reclaim, Rebuild, and Revitalize New Orleans and the Gulf Coast*. Boulder: Westview Press
- Bullock, J. A., Haddow, G. D. and K. Haddow (eds), 2009. *Global warming, natural hazards, and emergency management*. Boca Raton: CRC Press
- Butchers, A. G., 1953. *Centennial History of Education in Canterbury*. Christchurch: Centennial Committee of the Canterbury Education Board
- Butterworth, G. and Butterworth, S., 1998. *Reforming Education: The New Zealand Experience 1984-1996*. Palmerston North: Dunmore Press.
- Camacho, D. E., 1998. The Environmental Justice Movement. In: D. E. Camacho, ed. *Environmental Injustices, Political Struggles, Race, Class, and the Environment*. Duke University Press: Durham; pp.11-30
- Campbell, A. E., 1941. *Educating New Zealand*. Wellington: Department of Internal Affairs
- Curriculum and Pastoral Needs Analysis (CAPNA)* [online]
Available from <<http://ppta.org.nz/index.php/collective-agreements/conditions-of-employment/688-ca-capna-sept09>> [Accessed 28 December 2012]

Chapman, K., 1986. *The Sociology of Schools*. New York: Tavistock Publications.

Cheyne, C., O'Brien, M., Belgrave, M., 2008. *Social Policy in Aotearoa New Zealand*, Oxford University Press: Australia and New Zealand

Christchurch City Council report titled 'The Development of Christchurch' dated 18 August 1967, prepared by Town Planning, Engineering and Architectural staff of the City Engineer's Department.

Christchurch Earthquake – Insurance sector loss. [online] Available from <<http://www.theaustralian.com.au/in-depth/disaster-could-cost-insurance-sector-12bn/story-fn7ytpji-1226010988460>> [Accessed 29 March 2012]

Christchurch earthquake: School's out as parents look elsewhere. Dated 28 February 2011.[online] Available from <http://www.nzherald.co.nz/education/news/article.cfm?c_id=35&objectid=10709205> [Accessed on: 7 January 2012]

Christchurch Rebuild - \$40B – 28April 2013. [online] Available from: <<http://johnkey.co.nz/archives/1652-Govt-stands-by-Chch-as-rebuild-cost-estimate-rises.html>> [Accessed on 28 April 2013]

Clark, W., 1987. School desegregation and white flight: A reexamination and case study. *Social Science Research* 16 (3), pp.211–228.

Coates, G., 2002. *The Rise and Fall of the Southern Alps*. Christchurch: Canterbury University Press

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfield, F. D., York, R. J., 1966. *Equality of Educational Opportunity*. Washington: U.S. Government Printing Office

Coleman, J. S., 1968. The Concept of Equality of Educational Opportunity. *Harvard Educational Review*, 38, pp.7-22.

Coleman, J. S., and Hoffer, T. 1987. *Public and Private Schools: The Impact of Communities*. Basic Books: New York.

Cresswell, D., 1956. *Eight Christchurch Schools*. Christchurch: Pegasus Press

Crowther Report, 1959. *15 to 18*. London: HMSO. [online] Available from <<http://www.educationengland.org.uk/documents/crowther/>> [Accessed 19 June 2012]

Cumming, I. and Cumming, A., 1978. *The History of State Education in New Zealand 1840-1975*. Wellington: Pitman.

Cubrinovski, M., Henderson, D. and Bradley, B. A. 2012. Liquefaction impacts in residential areas in the 2010-2011 Christchurch earthquakes. Tokyo, Japan: One Year after 2011 Great East Japan Earthquake: *International Symposium on Engineering Lessons Learned from the Giant Earthquake*, 3-4 Mar 2012. [online]. Available from <<http://ir.canterbury.ac.nz/handle/10092/6712>> [Accessed on 7 April 2013]

Cunningham, C. J., Jones, M. A., and Dillon, M. 2003. Children and Urban Regional Planning: Participation in the Public Consultation Process through Story Writing. *Children's Geographies*. Vol. 1, No.2, 201-221, 2003

Cyclone Tracy – Northern Territory Library Cyclone Tracy Website. [online] . Available from <<http://ntlapp.nt.gov.au/tracy/basic/Tracy.html>> [Accessed on: 29 March 2012]

Cyclone Tracy – National Archives of Australia. [online]. Available from <<http://www.naa.gov.au/collection/fact-sheets/fs176.aspx>> [Accessed on: 11 May 2012]

Cyclone Tracy – Attorney-General's Department Disasters Database [online]. Available from <<http://www.disasters.ema.gov.au/Browse%20Details/DisasterEventDetails.aspx?DisasterEventID=2174>> [Accessed on: 14 May 2012]

Cyclone Tracy – Meteorological Report [online]. Available from <<http://web.archive.org/web/20090214000339/http://www.bom.gov.au/weather/cyclone/nt/Tracey.shtml>> [Accessed on: 14 May 2012]

Cyclone Tracy – history of cyclones in Darwin. [online]. Available from <http://ntlapp.nt.gov.au/tracy/basic/History_Cyclones.html> [Accessed on: 14 May 2012]

Cyclone Tracy – unedited stories from survivors and rescuers. [online] Available from <<http://www.enjoy-darwin.com/tracy-stories.html>> [Accessed on: 14 May 2012]

Cyclone Tracy – what would happen if Cyclone Tracy hit Darwin in 2008. [online] <http://www.ga.gov.au/hazards/our-capabilities/case-studies/what-would-happen-if-cyclone-tracy-hit-darwin-in-2008.html> [Accessed on: 14 March 2013]

Darwin, Australia. [online]. - <http://profile.id.com.au/darwin/home> sourced 13 March 2013

Dawes, John (2008). Do Data Characteristics Change According to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales. *International Journal of Market Research* 50 (1): 61–77.

Davey, I., 1928. *Fifty Years of National Education in New Zealand 1878-1928*. Auckland: Whitcombe & Tombs Ltd

Delpit, L., 2006. *Other people's children: Cultural conflict in the classroom*. New York: New Press.

De Vaus, D. (1991) *Surveys in Social Research*. Allen & Unwin Ltd: Sydney

Economic impacts of the Canterbury Earthquakes. New Zealand's Reserve Bank. Available from <http://www.rbnz.govt.nz/research/bulletin/2012_2016/2012sep75_3parkersteenkamp.pdf> [Accessed 14 March 2013]

First School in England (Canterbury). [online] Available from <<http://www.educationengland.org.uk/history/chapter01.html>> [Accessed 21 May 2012]

First school in NZ – Bay of Islands. [online] Available from
<<http://www.teara.govt.nz/en/biographies/1k9/1>> [Accessed on 21 May 2012]

First school in USA – Boston. [online] Available from
<<https://www.bls.org/podium/default.aspx?t=113760&rc=1>> [Accessed on 21 May 2012]

Floud, J. E., Halsey, A. H. and Martin, F. M., 1958. *Social class and educational opportunity*. London: Heinemann.

Foley, M. W. and Edwards, B., 1997. Escape From Politics? Social Theory and the Social Capital Debate. *American Behavioral Scientist*. 40 (5), 550.

Foster, P., Goom, R. and Hammersley, M., 1996. *Constructing Educational Inequality: An Assessment of Research on School Processes*. London: The Falmer Press.

Freeman, C, and Tranter, P., 2011. *Children and Their Urban Environment: Changing Worlds*. London: Earthscan

Giddens, A. J., 1993. *Sociology*. 2nd ed. Cambridge: Polity Press

Gilbert, D. L., 2008. *The American Class Structure in an Age of growing inequality*. New York: Pine Forge Press

Gillard, D., 2011. *Education in England: a brief history* [online resource]
Available from <<http://www.educationengland.org.uk/history/>> [Accessed 26 March 2012]

Gencer, E. A., 2013. *Natural Disasters and Risk Management in Urban Areas*. [online] Available from
< <http://www.springer.com/law/environmental/book/978-3-642-29469-3>> [Accessed 11 March 2013]

Gordon, L., 1999. From Nation-Building to Profit-Making: The Past, Present and Future of Schooling in New Zealand. *New Zealand Journal of Educational Studies*. 34 (1), 1999 247-254

Godwin, R. K., Leland, S. M., Baxter, A. D., and Southwork, S., 2006. Sinking Swann: Public School Choice and the Resegregation of Charlotte's Public Schools. *Review of Policy Research*, 23(5), 984-997

Greendale Fault. [online]. Available from
<<https://quakestudies.canterbury.ac.nz/store/object/874?id=17107&view=media>>
[Accessed on: 18 March 2013]

Hanushek, E. A., Kain, J. K., and Rivkin, S G., 2009. New evidence about Brown v. Board of Education: The complex effects of school racial composition on achievement. *Journal of Labor Economics*, 27, no. 3 (July): 349-383

Halsey, A. H., 1973. *Educational priority*. London:HMSO.

Harrison, M., 2004. *Education Matters: Government, Markets and New Zealand Schools*. Education Forum: Wellington

Havighurst, R. J. and Neugarten, B. L., 1975. *Society and Education*. 4th ed. Boston: Allyn and Bacon Inc.

Hardy, L., 2006. Katrina Exposes Our Schools' Shameful Inequality. *The Education Digest*. Mar 2006, 41, 7, pp.27-31

Hemmings, A., 2007. Seeing the Light: Cultural and Social Capital Productions in an Inner-city High School. *The High School Journal*. 90 (3) pp.9-17. [online].
Available from < <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/220221236>> [Accessed on 19 June 2012]

Herbert, D. T., 1976. Urban Education: Problems and Policies. In: D.T. Herbert and R. J. Johnston, eds. *Social Areas in Cities Vol.2*. Wiley.

Hiatt, D. B., 1994. Parent Involvement in American Public Schools: An Historical Perspective 1962-1994. *School Community Journal*. 4 (2) Fall/Winter pp.27-38

Hill, P., Pierce, L. C. and Guthrie, J.V., 1997. *Reinventing Public Education: How Contracting can transform America's schools*. University of Chicago Press: London

Housing Affordability. [online] Available from
<<http://www.greaterchristchurch.org.nz/News/PDF/UDSHousingAffordabilityDraftReportFebruary2012.pdf>> [Accessed 13 March 2013]

Hughes, D., Lauder, H., Watson, S., Hamlin, J., and Simiyu, I., 1996. *Markets in Education: Testing the Polarisation Thesis: the Smithfield Project Phase Two*. Ministry of Education: Wellington

Hurricane Katrina – National Hurricane Center report. [online] Available from
<<http://www.nhc.noaa.gov/pdf/nws-nhc-6.pdf>> [Accessed on 29 March 2012]

Hurricane Katrina – facts. [online] Available from
<<http://www.hurricanekatrinarelief.com/faqs.html>> [Accessed on: 22 May 2012]

Hursh, D. W., 2007. Marketing Education: The Rise of Standardized Testing, Accountability, Competition, and Markets in Public Education. In: E. W. Ross and R. Gibson, eds. *Neoliberalism and Education Reform*. New Jersey: Hampton Press, pp.15-34.

Iannelli, C., and Pateron, L., 2005. Does Education Promote Social Mobility? *Education and Social Mobility in Scotland since the Middle of the 20th Century*. Briefing No.35, June 2005.

Impacts of New Zealand's Education Reforms [online]. Available from
<<http://www.nzcer.org.nz/research/impact-education-reforms>> [Accessed 16 April 2013]

International Evaluation for School Achievement (IEA). Available from
<http://www.iea.nl/about_us.html> [Accessed on 23 February 2012]

Jackson, B., and Marsden, D., 1962. *Education and the Working Class*. London: Routledge and Keagan Paul.

Jackson, T., and Dixon, J., 2007. The New Zealand Resource Management Act: an exercise in delivering sustainable development through an ecological modernisation agenda. *Planning and Design*, 34(1) 107-120

Jackson, R. L., 2010. *Encyclopedia of Identity*. Thousands Oaks, CA: Sage.

Jencks, C., Smith, M., Ackland, H., Bane, M. J., Cohen, d., Gintis. H., Heyns, B. and Michelson, S., 1972. *Inequality – a Reassessment of the Effect of family and Schooling in America*. London: Allen Lane.

Jencks, C. S., and Mayer, S. E., 1990. The social consequences of growing up in a poor neighborhood. In: L. E. Lyn and M. McGeary, eds. *Inner-city poverty in the United States*. Washington, DC: National Academy of Sciences, pp.111–186.

Jerrett, M. and Finkelstein, M. 2005. Geographies of risk in studies linking chronic air pollution exposure to health outcomes. *Journal of toxicology and environmental health*. Vol 68, Issue 13-14, pp. 1207-1242.

Johnson, M., 2006. Geographical Reflections on the “New” New Orleans in the Post-Hurricane Katrina Era. *Geographical Review*, Volume 96, No.1 pp. 139-156

Johnston, R. J., 1993. The Rise and Decline of the Corporate-Welfare State: A Comparative Analysis in Global Context. In: P. J. Taylor, eds. *Political Geography of the Twentieth Century*. New York: Halsted Press, pp.115-170.

Johnston, R. J., Gregory, D., Pratt, G., and Watts, M., 2000. *The Dictionary of Human Geography*. 4th edition. Victoria: Blackwell Publishing.

Kahn, M. E. 2005. The Death Toll from Natural Disasters: The Role of Income, Geography, and Institutions. *The Review of Economics and Statistics* 87(20): 271-284.

Kaiser, A., et al. 2012. The M_w 6.2 Christchurch earthquake of February 2011: preliminary report. *New Zealand Journal of Geology and Geophysics*, Volume 55, Issue 1, 2012. [online] Available from < <http://www.tandfonline.com/doi/pdf/10.1080/00288306.2011.641182>> [Accessed on 15 April 2013]

Kamel, N., M., O. and Loukaitou-Sideris, A., 2003. Residential Assistance and Recovery Following the Northridge Earthquake. *Urban Studies*, Vol. 41, No.3, 533-562.

Kapucu, N., Hawkins, C. V., Rivera, F. I. 2013. *Disaster Resiliency: Interdisciplinary Perspectives*. New York: Routledge

Khalifa, M., 2010. Validating Social and Cultural Capital of Hyperghettoized At-Risk Students. *Education and Urban Society* 42(5) pp.620-646.

- King, R. 1974. Social Class, educational attainment and provision: a LEA case study. *Policy and Politics*, 3, pp.17-36
- Kingham, S., Pearce, J., Zawar-Reza, P., 2007. Driven to injustice? Environmental justice and vehicle pollution in Christchurch, New Zealand. *Transportation Research*, Part D 12, pp.254-263
- Kingham, S., Pearce, J., 2008. Environmental inequalities in New Zealand: a national study of air pollution and environmental justice. *Geoforum*, vol 39, issue 2, March 2008, pp.980-993.
- Kluger, R., 1975. Simple Justice. New York: Random House
- Lareau, A., 2002. Invisible inequality: Social class and childrearing in Black families and White families. *American Sociological Review*, 67, pp.747-776.
- Lauder, H., Hughes, D., Waslander, S., Thrupp, M., McGlinn, J., Newston, S., Dupuis, A., 1994. *The Creation of Market Competition for Education in New Zealand. An empirical analysis of a New Zealand secondary school market 1990-1993. The Smithefield Project Phase One*. Ministry of Education: Wellington
- Lindell, M.K., and Perry, R. W., 1998. Earthquake Impacts and Hazard Adjustment by Acutely Hazardous Materials Facilities Following the Northridge Earthquake. *Earthquake Spectra*: May 1998, 14 (2), pp. 285-299.
- Lindstrom, M. J., ed., 2011. *Encyclopaedia of U.S. Government and the Environment: History, Policy, and Politics*. CA: Santa Barbara.
- Lipman, P., 2007. No Child Left Behind – Globalization, Privatization, and the Politics of Inequality. In: E. W. Ross and R. Gibson, eds. *Neoliberalism and Education Reform*. New Jersey: Hampton Press, pp.35-58.
- Lynch, P., 2000. Religious Education: A Right and Growing Societal Imperative. *God and Government: The New Zealand Experience*, eds R. Ahdar and J. Stenhouse, 2000. University of Otago Press: Dunedin
- Macintyre, S., Macler, S., Sooman., 1993.. Area, class and health: Should we be focusing on places or people? *Journal of Social Policy*, 22(2), pp.213-234.
- Martel, G., 2011. *A Companion to Europe 1900-1945*. Hoboken: Wiley-Blackwell,
- Martinez, E., and Garcia, A., 2000. *What Is Neoliberalism: A Brief Definition*. [online]. Available from < http://ncccr.unca.edu/sites/ncccr.unca.edu/files/Instructor_Handouts/Wiley_Bob_Politics_Left_and_Right_Week_5-Neoliberalism.pdf > [Accessed 16 April 2013]
- Massey, D. S. and Denton, N. A., 1993. *American Apartheid: Segregation and the making of the underclass*. Cambridge, MA: Harvard University Press,
- McCulloch, G., 1998. *Failing the Ordinary Child? The theory and practice of working-class secondary education*. Buckingham: Open University Press.

- McKenzie, D., Lee, H. and Less, G., 1996. *Scholars or Dollars?* Palmerston North: Dunmore Press.
- McLennan, G., Ryan, A. and Spoonley, P., 2004. *Exploring Society - Sociology for New Zealand Students*. 2nd edition. Auckland: Pearson Education NZ Ltd.
- Miller, H. L. and Woock, R. R., 1970. *Social Foundations of Urban Education*. Hinsdale Illinois: The Dryden Press Inc.
- Milne, G. 1977. Cyclone Tracy: the effect on Darwin children. *Australian Psychologist*. Volume 12, issue 1, p.55
- Ministry of Education, New Zealand, 2010. *OECD Review on Evaluation and Assessment Frameworks for Improving School Outcomes: New Zealand Country Background Report 2010*. [online] Available from < <http://www.educationcounts.govt.nz/publications/schooling/oecd-review-on-evaluation-and-assessment-frameworks-for-improving-school-outcomes/foreword> > [Accessed 26 March 2012]
- Mitchell, G. and Dorling, D. 2003. An environmental justice analysis of British air quality. *Environmental and Planning A* 35(5), pp. 909-929.
- Moore, C. 2011. *Earthquake: Christchurch, New Zealand 22 February 2011*. Auckland: Random House
- Morrison, J. P., 1948. *The Evolution of a City – the story of the growth of the city and suburbs of Christchurch 1850-1903*. Christchurch: Christchurch City Council
- Mulvaney, D. and Robbins, P., eds., 2010. *Green politics: an A-to-Z guide*. CA: Sage.
- Murdoch, J. H., 1943. *The High Schools of New Zealand*. Wellington: Whitcombe & Tombs Ltd
- Neven, A., and Thompson, P., 2011. The educational mission of the Sisters of Saint Joseph of the Sacred Heart in Aotearoa New Zealand: 1880s to 2010. *International Studies in Catholic Education*, 3 (2).
- Newmark, K. G. and De Rugy, V. 2006. Hope after Katrina: Will New Orleans become the New City of Choice. *Education Next*, 6 (4), pp. 12-21
- New Orleans History*. [online] Available from <http://www.bycitylight.com/cities/us-la-new_orleans-history.php> [Accessed on: 22 May 2012]
- Newton, D.E., 2009. *Environmental Justice: A Reference Handbook*. CA: Santa Barbara.
- Newsom Report, 1963. *Half our Future*. London: HMSO. [online] Available from <<http://www.educationengland.org.uk/documents/newsom/>> [Accessed on: 19 June 2012]
- New Zealand Board of Trustees*. [online] Available from <<http://www.minedu.govt.nz/Boards/EffectiveGovernance/BoardElections.aspx>> [Accessed on: 27 March 2012]

- New Zealand Education Reform Act 1988. [online]
Available from <<http://www.legislation.govt.nz/act/public/1989/0080/68.0/contents.html>>
[Accessed 26 March 2012]
- New Zealand Ministry of Education Press Release dated 5 September 2010. *School Closures following Canterbury Earthquake* . [online] Available from
<<http://www.minedu.govt.nz/theMinistry/AboutUs/mediaCentreLanding/mediaReleaseIndex2010/MR15CanterburyEarthquakeSchoolClosures.aspx>> [Accessed on: 7 January 2013]
- New Zealand Qualifications Authority (NZQA). [online] Available
from<<http://www.nzqa.govt.nz/about-us/our-role/what-we-do/>> [Accessed on: 8 January 2012]
- NZQA. *Earthquake Impaired Derived Grades*. [online] Available
from<<http://www.nzqa.govt.nz/about-us/publications/newsletters-and-circulars/secqual/eq-impaired-derived-grade/>> [Accessed on: 11 January 2013]
- New Zealand Standard Classification of Occupations (NZSCO95). [online]. Available from
[http://www2.stats.govt.nz/domino/external/pasfull/pasfull.nsf/0/4c2567ef00247c6acc256b0400682195/\\$FILE/Nzsco95.txt](http://www2.stats.govt.nz/domino/external/pasfull/pasfull.nsf/0/4c2567ef00247c6acc256b0400682195/$FILE/Nzsco95.txt) [Accessed on 28 April 2013]
- Norris, F. H., 2002. Disasters in Urban Context. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 79(3) pp.308-314.
- Northridge Earthquake – USGS report. [online]. Available from< <http://pubs.usgs.gov/of/1996/ofr-96-0263/introduc.htm#impacts>> [Accessed on 26 June 2012]
- Northridge Earthquake. [online] Available from
<http://webarchive.iiasa.ac.at/Research/RMP/july2000/Papers/Northridge_0401.pdf>
[Accessed on: 18 March 2013]
- Olssen, M., 2002. *The Neoliberal Appropriation of Tertiary Education Policy in New Zealand: Accountability, Research and Academic Freedom*. Wellington:NZARE.
- Orfield, G., 2001. *Schools more separate: Consequences of a decade of re-segregation*. Cambridge, MA: Harvard University Civil Rights Project .
- Painter, J. 1995. The Corporate Welfare State and Beyond. In: R. J. Johnston, P. J. Taylor and Watt, M., eds. *Geographies of Global Change*. Oxford: Blackwell, pp.127-144.
- Pais, J. F. and Elliot, J. R., 2008. Places as Recovery Machines: Vulnerability and Neighborhood Change After Major Hurricanes. *Social Forces* - 86(4) pp.1415-1453.
- Pattie, C. J., 1986. Positive discrimination in the provision of primary education in Sheffield. *Environment and Planning A*, 18(9), pp.1249 – 1257.
- Pastor JR, M., Sadd, J. and Hipp, J., 2001. Which came first? Toxic Facilities, Minority Move-In, and Environmental Justice. *Journal of Urban Affair*, 12(1), pp.1-21

Pearce, D. and Gordon, L., 2005. In the zone: New Zealand's legislation for a system of school choice and its effects. *London Review of Education*, 3(2), pp.145-157.

Pettigrew, T. F., 2008. Still a long way to go. In: Adams, M. Biernat, N. R. Branscombe, C. S. Crandall and L. S. Wrightsman, eds. *Commemorating Brown: The Social Psychology of Racism and Discrimination*. Washington: American Psychological Association. pp.45-61.

Pinch, S., 1997. *Worlds of Welfare – Understanding the Changing Geographies of Social Welfare Provision*. London: Routledge.

Plowden Report, 1967. *Children and Their Primary Schools*. London: HMSO. [online] Available from <<http://www.educationengland.org.uk/documents/plowden/>> [Accessed 19 June 2012]

PPTA, 2011. *Submission on the Christchurch City Council Draft Annual Plan by the Post Primary Teachers' Association*. Ref: AA 14/17 dated 14 September 2011. pp. 48. [online] Available from <www.ppta.org.nz/.../PPTASubChristchurchPlanSept2011.pdf> [Accessed 29 June 2012]

PPTA submissions on education renewal of Christchurch following the Canterbury earthquake. [online]. Available from< <http://www.ppta.org.nz/index.php/-issues-in-education/canterbury-quake/2275-chch-edurenawal-sub>>. [Accessed on: 29 June 2012]

Raffe, D., Croxford, L., Iannelli, C., Shapira, M., Howieson, C., 2006. *Social-Class Inequalities in Education in England and Scotland*. Centre for Education Sociology Briefing Paper No. 40, May 2006.

Rentoul, J. and Rosanowski, J., 2000. The effects of school governance, ownership, organisation and management on educational outcomes. *NZ Ministry of Education strategic research initiative literature review 4*. Wellington: Ministry of Education.

Rivera, F. I. and M. R. Settembrino, 2009. *Social Capital Report: Building Disaster Resilience and Sustainability in Rural Communities in Central Florida*. <http://marcsettembrino.com/wordpress/wp-content/uploads/2009/02/Social-Capital-Report-Final-1.pdf>

Rivera, F.I. and M. R. Settembrino, 2013. Sociological Insights on the Role of Social Capital in Disaster Resilience. In: N. Kapucu, C. V. Hawkins, F. I. Rivera, eds. *Disaster Resiliency: Interdisciplinary Perspectives*. New York: Routledge

Robinson, V., Ward, L. and Timperley, H., 2003. The difficulties of school governance: A layperson's job? *Educational Management and Administration*, 31(3), pp.263–281.

Ross, E. W. and Gibson. R., 2007. *NeoLiberalism and Education Reform*. New Jersey: Hampton Press.

Rothstein, R., 2005. *Class and Schools: Using Social, Economic, and Educational Reform to Close the Achievement Gap*. Washington: Economic Policy Institute.

Sadovnik, A. R., 2007. Theory and Research in the Sociology of Education. In: A. R. Sadovnik, ed. *Sociology of Education- a Critical Reader*. New York: Routledge, pp.3-22.

Salmond, K., 1999., Setting our sights on justice: Contaminated sites and socio-economic deprivation in New Zealand. *International Journal of Environmental Health Research* – 9(1), pp.19-29.

Shaughnessy, T. M., White, M.L., and Brendler, M. D., 2010. The Income Distribution Effect of Natural Disasters: An Analysis of Hurricane Katrina. *The Journal of Regional Analysis and Policy*. 40 (1) 84-95.

Simons, C. R., 1980. *Inequalities in Educational Attainment in Christchurch Secondary Schools*. (MA Thesis) University of Canterbury, New Zealand.

Skeels, H. M., 1966. Adult Status of Children with Contrasting Early Life Experiences. *Monographs of the Society for Research in Child Development*. 31(3), pp.1-65. [online]
Available from <<http://www.jstor.org/stable/1165791>> [Accessed 19 June 2012]

Snook, I., 2009. *Social Class and Educational Achievement: Beyond Ideology*. Massey University. [online] Available from <<http://www.ihad.co.nz/doc/Paper%20-%20Social%20Class%20and%20Educational%20Achievement%20-%20Beyond%20Ideology%20-%20Prof%20Snook.pdf>> [Accessed 16 July 2012]

Spreng C. P., 2005. *Policy Options for Interventions in Failing Schools*. Rand: Santa Monica.

Springford, L., 2006. *Tomorrow's primary schools: Time to evaluate governance alternatives?* Policy Quarterly, 2(3), pp.32–39.

Stevens, R., n.d. *Darwin after Cyclone Tracy hit December 1974*. [image online]. Available from <<http://www.theage.com.au/afl/afl-news/a-tense-time-waiting-for-the-storm-to-strike-20100714-10b34.html>> [Accessed 14 March 2012].

Swann Report (1985). [online] Available on:< <http://www.educationengland.org.uk/documents/swann/>> [Accessed on: 15 April 2013]

Swann v. Board of Education, 402 U.S. 1 (1971). [online] Available from <<http://caselaw.lp.findlaw.com/scripts/getcase.pl?court=US&vol=402&invol=1>> [Accessed on: 13 June 2012]

Taylor, N., Gollop, M., Herbison, R., Freeman, C., Nairn K. (unpublished). *Dislocation following the Christchurch earthquake: Children and young peoples experiences*. [online]. Available from <http://www.otago.ac.nz/crcf/research.html#earthquake> [Accessed 7 April 2013]. Press release available from < <http://m.otago.ac.nz/news/otago037091.html>> [Accessed 7 April 2013]

Thorndike, R. L., 1973. *Reading Comprehension Education in Fifteen Countries – International Studies in Evaluation III*. Sweden: Almqvist & Wiksell.

Thrupp, M., 1997. How School Mix Shapes School Processes: A Comparative Study of New Zealand Schools. *New Zealand Journal of Educational Studies*, 32(1).

Thrupp, M., 1998. Exploring the Politics of Blame: school inspection and its contestation in New Zealand and England. *Comparative Education*, 34(2), pp.195-208.

Thrupp, M., Harold, B., Mansell, H., and Hawksworth, L., 2000. *Mapping the Cumulative Impact of Education Reform: a study of seven New Zealand schools*. Hamilton: University of Waikato.

Thrupp, M. (2007) *Education's 'inconvenient truth': persistent middle class advantage*. Inaugural professional lecture given by Martin Thrupp, School of Education, University of Waikato, 2 March 2007.

Tierney, K. J. (1997). Business Impacts of the Northridge Earthquake. *Journal Of Contingencies & Crisis Management*, 5(2), 87.

Tileston D. W. and Darling, S. K., 2009. *Closing the Poverty and Culture gap*. Corwin Press, California.

Tohoku Earthquake and Tsunami. [online] Available from
<<http://www.npa.go.jp/archive/keibi/biki/higaijokyo.pdf>> [Accessed on: 14 March 2013]

Treaty of Waitangi. [online] Available from<<http://www.nzhistory.net.nz/politics/treaty/the-treaty-in-brief>> [Accessed on: 23 May 2012]

Tsunami, Port of Lyttelton, 1868. [online] Available from
<<http://www.teara.govt.nz/en/tsunamis/page-2>> [Accessed on: 19 March 2013]

Tunstall, H. V. Z., Shaw, M. and Dorling, D., 2004. Places and health. *Journal of Epidemiology and Community Health*, 58(1), pp.6-10.

United Kingdom Education Reform Act 1988. [online] Available from
<<http://www.legislation.gov.uk/ukpga/1988/40/contents>> [Accessed 26 March 2013]

United Kingdom Education. [online] Available from
<<http://www.educationengland.org.uk/documents/pdfs/1988-education-reform-act.pdf>>
<<http://www.educationengland.org.uk/history/chapter08.html>> [Accessed on: 26 March 2012]

USA Elementary and Secondary Education Act. [online] Available from
<<http://www2.ed.gov/policy/elsec/leg/esea02/index.html>> [Accessed on: 26 March 2012]

Van der Steeg, M., 2005. *Why should governments intervene in education and how effective is education policy*. [online] <http://ideas.repec.org/p/cpb/memodm/122.html> [Accessed 28 April 2013]

Waimakairiri River Stopbanks. [online] Available from
<http://www.geerassociation.org/GEER_Post%20EQ%20Reports/Christchurch_2011/06%20-%20Stopbanks%20rev1.pdf> [Accessed on: 20 March 2013]

Walford, G., 1994. *Choice and equity in education*. London: Cassell.

Walker, G. G. (2011). Comparison of the impacts of Cyclone Tracy and the Newcastle earthquake on the Australian building and insurance industries. *Australian Journal Of Structural Engineering*, 11(3), 283-293.

Wang, L., Beckett, G. and Brown, L., 2006. Controversies of Standardized Assessment in School Accountability Reform: A Critical Synthesis of Multidisciplinary Research Evidence. *Applied Measurement in Education*, 19(4), pp. 305-328.

Warren, L., 2002. *Class in the Classroom*. Derek Bok Center for Teaching and Learning. [online] Available from < <http://isites.harvard.edu/fs/html/icb.topic58474/class.html> > [Accessed 5 June 2012]

Weaver, S., Sewell, R., Dorsey, C., 1985. *Extinct Volcanoes: a guide to the geology of Banks Peninsula*. Lower Hutt: Geological Society of New Zealand.

Webster, A. S. 1975. *High Status Residential Areas in Christchurch – Structure and Structural Change, 1878 to 1973*. Christchurch: University of Canterbury (Thesis: M.A, Geography) [online resource] Available from <<http://ipac.canterbury.ac.nz/ipac20/ipac.jsp?session=13660H9VI2178.2386&profile=a&uri=link=3100008~!56399~!3100001~!3100002&aspect=subtab13&menu=search&ri=1&source=~!culib&term=Webster%2C+A.+S.+%28Allan+Stanley%29&index=AUTHOR#focus>> [Accessed on 16 April 2013]

Weyman, J. C. and Anderson-Berry, L. J., 2002. *Societal Impacts of Tropical Cyclones*. Available from <<http://www.aoml.noaa.gov/hrd/iwtc/AndersonBerry5-1.html>> [Accessed 15 May 2012]

Wilkinson, R. G., and K. Pickett., 2009. *The Spirit Level: why more equal societies almost always do better*. Penguin Books: London.

Williamson, W., and D. S. Byrne, 1979. Educational Disadvantage in an Urban Setting, D. T. Herbert and D.M.Smith eds in *Social Problems & the City: Geographical Perspectives*. New York: Oxford University Press, pp 186-200.

Wrightsmen, L. S. 2008. Organised Psychology's Efforts to Influence the Supreme Court on Matters of Race and Education. In: G. Adams, M. Biernat, N. r. Branscombe, C. S. Crandall, L. S. Wrightsmen, eds. *Commemorating Brown: The Social Psychology of Racism and Discrimination*. Washington: American Psychological Association, pp.25-43.

Wylie, C., 1995. The shift to school-based management in New Zealand—the school view. In: D. S. G. Carter and M. H. O'Neill, eds. *Case studies in educational change: An international perspective*. London: Falmer Press, pp.61-80.

Wylie, C., 1997. *The role of New Zealand school boards in 1997*. Wellington, New Zealand Council for Educational Research. Available from <<http://www.nzcer.org.nz/system/files/2707.pdf>> [Accessed 21 May 2012]

Wylie, C., 2007. *What can New Zealand learn from Edmonton*. New Zealand Centre for Educational Research. Available from <<http://www.nzcer.org.nz/pdfs/15845.pdf>> [Accessed 2 July 2012]

Wylie, C., 2007. *School governance in New Zealand – how is it working?* New Zealand Centre for Educational Research. Available from <<http://www.nzcer.org.nz/pdfs/15252.pdf>> [Accessed 21 May 2012]

Appendices

Appendix 1: Canterbury Earthquake (Education Act) Order 2011

Appendix 2: NCEA results (2009-2012) of thirty-four greater Christchurch secondary schools

Appendix 3: Questionnaire Information Sheet

Appendix 4: Student Questionnaire

Appendix 5: Teacher and Staff Questionnaire

Appendix 6: Parent and Caregiver Questionnaire

Appendix 7: Student assent form

Appendix 8: Teacher and Staff consent form

Appendix 9: Parent and Caregiver consent form

Appendix 10: University of Canterbury Human Ethics Committee Approval Letter

Appendix 11: NZQA Earthquake Impaired Derived Grade Process

Appendix 12: 2012 NCEA levels 1-3 change in overall school results from 2011

Appendix 13: 2012 NCEA level 3 results as a percentage of change from 2011 NCEA level 3 results.

Reprint
as at 2 April 2012



**Canterbury Earthquake
(Education Act) Order 2011**

(SR 2011/38)

Canterbury Earthquake (Education Act) Order 2011: expired, on 2 April 2012,
by clause 3.

Anand Satyanand, Governor-General

Order in Council

At Wellington this 8th day of March 2011

Present:

His Excellency the Governor-General in Council

Pursuant to section 6 of the Canterbury Earthquake Response and Recovery Act 2010, His Excellency the Governor-General makes the following order acting—

- (a) on the advice and with the consent of the Executive Council;
and
- (b) on the recommendation of the relevant Minister made in accordance with section 6(2) of that Act.

Note

Changes authorised by section 17C of the Acts and Regulations Publication Act 1989 have been made in this reprint.

A general outline of these changes is set out in the notes at the end of this reprint, together with other explanatory material about this reprint.

This order is administered by the Ministry of Education.

cl 1 **Canterbury Earthquake (Education Act) Order 2011** Reprinted as at 2 April 2012

Contents

	Page
1 Title	2
2 Commencement	3
3 Expiry	3
4 Interpretation	3
5 Modification of enrolment scheme	3
6 New section 11AA	4
11AA Purpose of special enrolment scheme for school in specified area	4
7 New section 11CA	4
11CA Special enrolment scheme	4
8 New section 65DA	5
65DA Minister may vary meaning of half-day immediately	5
9 New section 78HA	5
78HA Further purpose of Part in relation to managing risk resulting from Canterbury earthquake	5
10 New section 78IA	6
78IA Further application of interventions to manage risk resulting from Canterbury earthquake	6
11 New section 78LA	6
78LA Action plan to manage risk resulting from Canterbury earthquake	6
12 Exemption with respect to annual report, audit, financial statement, etc	7
13 Extension of meaning of home-based education and care service	7
14 Exemption from regulations made under section 314 or 317	8
15 Modification of Education (Early Childhood Centres) Regulations 1998	8

Order

- 1 Title**
This order is the Canterbury Earthquake (Education Act) Order 2011.

2

Reprinted as at
2 April 2012

Canterbury Earthquake (Education
Act) Order 2011

cl 5

2 Commencement

This order is deemed to have come into force on 22 February 2011.

3 Expiry

This order expires on the close of 1 April 2012.

4 Interpretation

(1) In this order, unless the context otherwise requires,—

Act means the Education Act 1989

another enactment means any 1 or more of the following:

- (a) Education (Early Childhood Centres) Regulations 1998;
- (b) Education (Early Childhood Services) Regulations 2008;
- (c) Education (Home-Based Care) Order 1992

specified area means the districts of the following territorial authorities:

- (a) Christchurch City Council;
- (b) Selwyn District Council;
- (c) Waimakariri District Council.

(2) Any term or expression that is not defined in this order but that is defined in the Education Act 1989 or the Education Act 1964 or the Canterbury Earthquake Response and Recovery Act 2010 has, in this order, the meaning given to it by that Act.

(3) Any modifications and extensions to the Act or to another enactment made by this order do not affect the text of the Act or enactment but require it to be read as if it had been amended in the manner indicated in the order.

5 Modification of enrolment scheme

While this order is in force, a student who is enrolled at a school in the specified area on 22 February 2011 continues to be regarded as living in the home zone of the school for the purposes of that school's enrolment scheme.

cl 6

Canterbury Earthquake (Education
Act) Order 2011Reprinted as at
2 April 2012**6 New section 11AA**

While this order is in force, the Act must be read as if the following section were inserted after section 11A of the Act:

“11AA Purpose of special enrolment scheme for school in specified area

The purpose of a special enrolment scheme under section 11CA is to manage risk that may occur as a result of the Canterbury earthquake to the network of schools and to the education and welfare of students both within and beyond the specified area.”

7 New section 11CA

While this order is in force, the Act must be read as if the following section were inserted after section 11C of the Act:

“11CA Special enrolment scheme

- “(1) The Secretary may, for the purpose set out in section 11AA, approve a special enrolment scheme for a school in the specified area, by written notice to the school’s board.
- “(2) A special enrolment scheme approved under subsection (1) may include (without limitation) any 1 or more of the following in relation to the school:
- “(a) a definition of its home zone;
 - “(b) categories or descriptions of students who are to be treated as if they live in the home zone for the purpose of section 11D(1);
 - “(c) a method for selecting applicants who live outside the home zone;
 - “(d) procedures and instructions for the operation of the scheme.
- “(3) The school’s board must comply with any procedures or instructions for the operation of the scheme that are set out in the scheme.
- “(4) A special enrolment scheme approved under subsection (1)—
- “(a) commences on the date specified in the notice; and
 - “(b) overrides, until further notice, any other enrolment scheme that the school has; and
 - “(c) may be amended or revoked by the Secretary, by written notice to the board.

Reprinted as at
2 April 2012

Canterbury Earthquake (Education
Act) Order 2011

cl 9

“(5) Sections 11C, 11E to 11N, and 11PA do not apply to a special enrolment scheme or to a school that has a special enrolment scheme.”

8 New section 65DA

While this order is in force, the Act must be read as if the following section were inserted after section 65D of the Act:

“65DA Minister may vary meaning of half-day immediately

- “(1) The Minister may, by written notice to a school’s board, authorise the board to apply a meaning of half-day that differs from the meaning it has in section 65B(3), if the Minister is satisfied that such a variation is appropriate in the circumstances.
- “(2) An authorisation under subsection (1) must be given either unconditionally or subject to such conditions as the Minister considers appropriate.
- “(3) The Minister may, by written notice to a school’s board, require the board to operate the school in accordance with a meaning of half-day that differs from the meaning it has in section 65B(3), if the Minister is satisfied that the variation and operation are appropriate in the circumstances.
- “(4) A student enrolled at a state school must comply with section 25 even if the meaning of half-day is varied under subsection (1) or (3).
- “(5) Subsection (1) or (3) (as the case may be) overrides the provisions in section 77 of the Education Act 1964 concerning the times at which state primary schools are to be kept open.”

9 New section 78HA

While this order is in force, the Act must be read as if the following section were inserted after section 78H of the Act:

“78HA Further purpose of Part in relation to managing risk resulting from Canterbury earthquake

A further purpose of this Part is to provide for interventions to manage risk that may occur as a result of the Canterbury earthquake to the network of schools and to the education and welfare of students both within and beyond the specified area.”

cl 10

Canterbury Earthquake (Education
Act) Order 2011Reprinted as at
2 April 2012**10 New section 78IA**

While this order is in force, the Act must be read as if the following section were inserted after section 78I of the Act:

“78IA Further application of interventions to manage risk resulting from Canterbury earthquake

- “(1) In addition to the reasons for interventions set out in section 78I, the Minister or Secretary (as the case may be) may apply any of the interventions described in section 78I(1)(b) to (e) to a school if he or she has reasonable grounds to believe that the intervention is needed to manage risk that may occur as a result of the Canterbury earthquake to the network of schools and to the education and welfare of students both within and beyond the specified area.
- “(2) When applying an intervention for the reasons set out in subclause (1), the Minister or Secretary (as the case may be) must apply whichever intervention he or she considers is reasonable to manage the risk without intervening more than necessary in the affairs of the school.
- “(3) The application of an intervention under this section does not preclude the application of any other intervention, either simultaneously or at any other time.”

11 New section 78LA

While this order is in force, the Act must be read as if the following section were inserted after section 78L of the Act:

“78LA Action plan to manage risk resulting from Canterbury earthquake

- “(1) The Secretary may, for the purpose set out in section 78HA, approve an action plan for a school by written notice to the school’s board, if the Secretary is satisfied that such a plan is appropriate in the circumstances.
- “(2) When the Secretary has approved an action plan under subsection (1), the school’s board—
- “(a) must implement it in accordance with its terms, unless or until the Secretary directs otherwise; and
- “(b) must make the plan available as if it were part of the school’s charter.

Reprinted as at
2 April 2012

Canterbury Earthquake (Education
Act) Order 2011

cl 13

“(3) Subsections (1) to (3) of section 78L do not apply to an action plan approved by the Secretary under subsection (1) of this section.”

12 Exemption with respect to annual report, audit, financial statement, etc

- (1) The board of a school in the specified area is exempt from the requirements of sections 87, 87A, and 87C(1) of the Act (which relate to the preparation of annual reports, annual financial statements and their audit, and the provision of audited annual financial statements to the Secretary) in respect of the financial year ending on 31 December 2010 until it is reasonably practicable for the board to comply with those requirements.
- (2) While this order is in force, the Minister may omit from any report prepared and presented under section 87B of the Act any information that is not available as a result of subsection (1).
- (3) While this order is in force, the Minister is exempt from providing, under section 87C(2) of the Act, copies of statements that are not available as a result of subsection (1).

13 Extension of meaning of home-based education and care service

While this order is in force, section 309 of the Act must be read, in relation to the specified area, as if the meaning of **home-based education and care service** were extended by substituting the following definition:

“**home-based education and care service** means—

- “(a) the provision by 1 person of education or care, for gain or reward, to fewer than 5 children under the age of 6 (in addition to any child enrolled at school who is the child of the person who provides education or care), in—
 - “(i) their own home; or
 - “(ii) the home of the person providing the education or care; or
 - “(iii) any other home nominated by the parents of the children; or

cl 14

Canterbury Earthquake (Education
Act) Order 2011Reprinted as at
2 April 2012

- “(b) the provision by 2 persons of education or care, for gain or reward, to fewer than 9 children under the age of 6 (in addition to any child enrolled at school who is the child of at least 1 of the persons who provides education or care), in—
- “(i) the children’s own home; or
 - “(ii) the home of at least 1 of the persons providing the education or care; or
 - “(iii) any other home nominated by the parents of the children”.

14 Exemption from regulations made under section 314 or 317

- (1) While this order is in force, the Secretary may exempt from a provision of another enactment any of the following that is in the specified area:
- (a) an early childhood education and care centre;
 - (b) an early childhood service;
 - (c) a home-based education and care service.
- (2) An exemption under subclause (1) must be—
- (a) by written notice to the centre, service, or the service provider of the home-based education and care (as the case may be); or
 - (b) by notice in the *Gazette*, to a group of centres, services, or service providers of home-based education and care (as the case may be) in the specified area.
- (3) An exemption under subclause (1) may be made subject to conditions specified in the notice.

15 Modification of Education (Early Childhood Centres) Regulations 1998

- (1) Without limiting the generality of clause 14, while this order is in force the Secretary may modify the provisions of the Education (Early Childhood Centres) Regulations 1998 in relation to an early childhood education and care centre in the specified area by granting the centre a temporary relocation licence, if the centre needs to be relocated temporarily as a result of the Canterbury earthquake.

Reprinted as at
2 April 2012

**Canterbury Earthquake (Education
Act) Order 2011**

Explanatory note

- (2) A licence under subclause (1) may be granted subject to any conditions the Secretary considers appropriate, and conditions specified in the licence may vary in duration, as specified in the licence.

Rebecca Kitteridge,
Clerk of the Executive Council.

Explanatory note

This note is not part of the order, but is intended to indicate its general effect.

This Order in Council, which is deemed to have come into force on 22 February 2011 and expires on the close of 1 April 2012, modifies the operation of the Education Act 1989 (the **Act**) by—

- allowing students who were attending schools on 22 February 2011 in Christchurch or the Selwyn or Waimakariri Districts (the **specified area**) and who have to relocate temporarily to other places because of the Canterbury earthquake to have a right to enrol at those schools (see *clause 5*);
- providing for special enrolment schemes for schools in the specified area to manage risk to the school network and students' education and welfare (see *clauses 6 and 7*);
- allowing the meaning of "half-day" to be varied immediately by the Minister, without consultation requirements, and require school boards to apply the varied meaning, so as to accommodate necessary variations in the opening and operating hours of schools (see *clause 8*);
- extending the circumstances in which interventions can be made in schools under Part 7A of the Act to include managing risk to the school network and students' education and welfare that may occur as a result of the Canterbury earthquake (see *clauses 9 to 11*);
- providing temporary exemptions from some financial reporting requirements in Part 8 of the Act (see *clause 12*);

Explanatory note	Canterbury Earthquake (Education Act) Order 2011	Reprinted as at 2 April 2012
------------------	--	---------------------------------

- allowing home-based education and care services in the specified area to operate with 2 carers and up to 8 children (see *clause 13*):
- allowing exemption in the specified area from some provisions of the Education (Early Childhood Centres) Regulations 1998, the Education (Early Childhood Services) Regulations 2008, and the Education (Home-Based Care) Order 1992 for early childhood education and care centres, early childhood services, and the provision of home-based education and care (see *clause 14*):
- providing for the granting of temporary relocation licences for early childhood education and care centres in the specified area, if those centres have to be relocated temporarily as a result of the Canterbury earthquake (see *clause 15*).

This Order in Council is made under the Canterbury Earthquake Response and Recovery Act 2010 and its effect is temporary.

Issued under the authority of the Acts and Regulations Publication Act 1989.
Date of notification in *Gazette*: 10 March 2011.

Reprinted as at 2 April 2012	Canterbury Earthquake (Education Act) Order 2011	Notes
---------------------------------	---	-------

Contents

- 1 General
- 2 Status of reprints
- 3 How reprints are prepared
- 4 Changes made under section 17C of the Acts and Regulations Publication Act 1989
- 5 List of amendments incorporated in this reprint (most recent first)

Notes**1 General**

This is a reprint of the Canterbury Earthquake (Education Act) Order 2011. The reprint incorporates all the amendments to the order as at 2 April 2012, as specified in the list of amendments at the end of these notes.

Relevant provisions of any amending enactments that contain transitional, savings, or application provisions that cannot be compiled in the reprint are also included, after the principal enactment, in chronological order. For more information, see <http://www.pco.parliament.govt.nz/reprints/>.

2 Status of reprints

Under section 16D of the Acts and Regulations Publication Act 1989, reprints are presumed to correctly state, as at the date of the reprint, the law enacted by the principal enactment and by the amendments to that enactment. This presumption applies even though editorial changes authorised by section 17C of the Acts and Regulations Publication Act 1989 have been made in the reprint.

This presumption may be rebutted by producing the official volumes of statutes or statutory regulations in which the principal enactment and its amendments are contained.

3 How reprints are prepared

A number of editorial conventions are followed in the preparation of reprints. For example, the enacting words are not included in Acts, and provisions that are repealed or revoked

are omitted. For a detailed list of the editorial conventions, see <http://www.pco.parliament.govt.nz/editorial-conventions/> or Part 8 of the *Tables of New Zealand Acts and Ordinances and Statutory Regulations and Deemed Regulations in Force*.

4 Changes made under section 17C of the Acts and Regulations Publication Act 1989

Section 17C of the Acts and Regulations Publication Act 1989 authorises the making of editorial changes in a reprint as set out in sections 17D and 17E of that Act so that, to the extent permitted, the format and style of the reprinted enactment is consistent with current legislative drafting practice. Changes that would alter the effect of the legislation are not permitted. A new format of legislation was introduced on 1 January 2000. Changes to legislative drafting style have also been made since 1997, and are ongoing. To the extent permitted by section 17C of the Acts and Regulations Publication Act 1989, all legislation reprinted after 1 January 2000 is in the new format for legislation and reflects current drafting practice at the time of the reprint.

In outline, the editorial changes made in reprints under the authority of section 17C of the Acts and Regulations Publication Act 1989 are set out below, and they have been applied, where relevant, in the preparation of this reprint:

- omission of unnecessary referential words (such as “of this section” and “of this Act”)
- typeface and type size (Times Roman, generally in 11.5 point)
- layout of provisions, including:
 - indentation
 - position of section headings (eg, the number and heading now appear above the section)
- format of definitions (eg, the defined term now appears in bold type, without quotation marks)
- format of dates (eg, a date formerly expressed as “the 1st day of January 1999” is now expressed as “1 January 1999”)

Reprinted as at
2 April 2012

**Canterbury Earthquake (Education
Act) Order 2011**

Notes

- position of the date of assent (it now appears on the front page of each Act)
- punctuation (eg, colons are not used after definitions)
- Parts numbered with roman numerals are replaced with arabic numerals, and all cross-references are changed accordingly
- case and appearance of letters and words, including:
 - format of headings (eg, headings where each word formerly appeared with an initial capital letter followed by small capital letters are amended so that the heading appears in bold, with only the first word (and any proper nouns) appearing with an initial capital letter)
 - small capital letters in section and subsection references are now capital letters
- schedules are renumbered (eg, Schedule 1 replaces First Schedule), and all cross-references are changed accordingly
- running heads (the information that appears at the top of each page)
- format of two-column schedules of consequential amendments, and schedules of repeals (eg, they are rearranged into alphabetical order, rather than chronological).

**5 *List of amendments incorporated in this reprint
(most recent first)***

Canterbury Earthquake (Education Act) Order 2011 (SR 2011/38): clause 3

Appendix 2: 2009-2012 NCEA levels 1-3 results of greater Christchurch secondary schools (%) published in 'The Press' (Christchurch newspaper).

Greater Christchurch Secondary Schools	Decile	2009 NCEA LEVEL 1	2010 NCEA LEVEL 1	2011 NCEA LEVEL 1	2012 NCEA LEVEL 1	2009 NCEA LEVEL 2	2010 NCEA LEVEL 2	2011 NCEA LEVEL 2	2012 NCEA LEVEL 2	2009 NCEA LEVEL 3	2010 NCEA LEVEL 3	2011 NCEA LEVEL 3	2012 NCEA LEVEL 3
Akaroa Area School (Yrs 1-13)	8	100	83.3	100	100	100	81.8	100	100	50	66.7	33.3	100
Aranui High School	2	59.4	46.3	66.3	60	42.2	45.5	62.9	54.3	25	12.1	55.6	40
Avonside Girls' High School	6	67.8	73.2	78.4	72.9	82.8	79.4	92.2	81.5	69.3	61.3	75.5	78.7
Burnside High School	8	83.1	79.9	88.1	86.3	81.9	77.1	85	86.7	76.8	73.7	82.5	82.2
Cashmere High School	8	63.1	70.7	79.4	85.2	73.1	71	82	79.1	58.8	64.6	65.2	70.3
Catholic Cathedral College (Yrs 7-13)	3	75.8	60	90.3	76.2	67.6	50	84.4	55.7	86.5	40.5	90.9	61.8
Christ's College	10	97.2	99.2	96.4	100	98.4	97.9	96.6	97.7	91.6	89.8	94.3	88.1
Christchurch Adventist School (Yrs 1-13)	6	86.7	82.4	95.7	75	81.8	81.3	92.3	100	86.7	76.9	85.7	100
Christchurch Boys' High School	9	77	82.6	83.5	87.4	77.5	79.6	89.4	85.7	58.3	61.7	80	75.2
Christchurch Girls' High School	9	91.4	88.5	95.7	96.3	93.9	95.2	96.6	98	89.1	85.7	91.3	90.2
Darfield High School (Yrs 7-13)	8	84.7	80.2	88.9	79.2	80.8	71.3	85.7	90.5	63.9	60	70	77.4
Ellesmere College (Yrs 7-13)	8	68.5	76.2	80.3	79.4	78.7	80	79.1	94.3	67.5	58.1	59.5	53.1
Hagley Community College	5	56.1	33.7	54.7	73.2	62.9	37.3	75	84.5	73.7	38.8	78.4	70.9
Hillmorton High School	5	53.3	52.6	66.7	59.8	64.1	52.6	84.1	74.5	51.4	50.4	67.2	74.6
Hornby High School	3	60.3	46	80.2	68.1	63.6	50	65.9	86.3	46.7	34.1	81	40
Kaiapoi High School	5	68.3	66.2	70	68.7	73.2	77.1	87.8	90.6	50.8	58.7	78.6	76.9
Lincoln High School	9	84.3	78.8	88.6	90.6	86.9	81.6	88.6	94.7	74.3	62.3	89.7	80.3
Linwood College	2	38	49.5	60.7	70.5	46.9	46.3	80.2	72.9	39.7	36.6	72.2	69
Mairehau High School	4	71.4	43.5	84.7	55.6	65.2	51.6	71.4	83	54.1	33.8	87.1	54.5
Marian College	7	96.8	92	93.8	94.2	91.8	87.5	90.4	84	86.5	74.7	78.4	78.9
Middleton Grange	9	83.5	86.2	88.6	91.7	83.8	90.4	90.3	89.8	67.6	70.5	83.8	75.8
Oxford Area School (Yrs 1-13)	7	57.1	65.6	68.3	70.8	71.4	82.6	64.3	76.9	47.6	22.2	61.5	35.3
Papanui High School	6	74.4	65.2	69.1	62.5	64.6	64.7	80.1	74.7	52.2	48.3	81.5	60.1
Rangi Ruru Girls' College	10	99.2	98.5	97.6	100	100	98.4	100	99.1	98.2	93.5	99.1	96.6
Rangiora High School	8	65.8	72.5	85.5	76.1	81.8	75.4	91.1	86.4	67.8	57.9	85.7	73
Rangiora New Life	8	97.4	100	97.1	91.9	76.9	76.5	80	75.7	71.4	85.7	73.7	62.1
Riccarton High School	7	72.3	62.4	76.3	79.1	67.6	65.3	83.7	85.4	73.1	53.7	76.6	66.4
St Bede's College	9	81.9	82.6	90.7	85.8	78.1	87.4	92	93.8	61.9	64.2	82.9	77.4
St Thomas of Canterbury College (Yrs 7-13)	8	75.3	74.7	85.7	80.6	76.1	63.3	75.9	86.2	45.1	46.8	68.9	77.4
Shirley Boys' High School	6	68.1	64.3	85.8	92.3	65.5	62	87	86.8	64.9	43.3	89.8	82.6
St Andrew's College (Yrs 1-13)	10	96.4	95.3	99.5	98	94.4	94.3	96.7	100	91.8	88.6	98.2	88.3
St Margaret's College	10	98.3	98.3	97.3	100	97.7	73.1	98.8	96.7	92.9	72	95.3	91.4
Unlimited Paenga Tawhiti	6	67.6	33.7	68.8	76.2	65.5	33.3	63.6	82.9	83.3	26.8	80.8	68
Villa Maria College (Yrs 7-13)	9	96.6	91.7	92.3	99.3	92.2	91.2	96.2	96.6	91.7	86.3	97.5	94.8

The educational impacts of Christchurch earthquakes and aftershocks on secondary school students: a geographical perspective



Questionnaire Information Sheet

September 2011

Dear Parents/Caregivers, Students, Teachers, Staff and the School Community of [redacted]

Research is currently being conducted through the University of Canterbury into how secondary school students, teachers and students' parents/caregivers are coping with the effects of Christchurch earthquakes and aftershocks. This research focuses on the effects of the earthquakes and aftershocks on education performance. Participants will also be asked to describe what they experienced on 22 February 2011.

Mrs Maria Connolly, a teacher [redacted], has prepared three questionnaires respectively, each written specifically for either a student, teacher or parent/caregiver. Each questionnaire has been approved by the Human Ethics Committee at the University of Canterbury. The questionnaires are confidential.

Mrs Connolly will be compiling the results which will be included in her Master of Science thesis. The supervisors of this thesis are Prof. Ross Barnett and Dr. David Conradson. Results will also be provided to [redacted]. Results may be published in a peer-reviewed academic publication. Completed questionnaires will be stored at the University of Canterbury and destroyed in 2016.

Parent/caregiver consent is required for students wishing to participate in this research. Students will need to provide signed parental consent before they complete the questionnaire. Parents can view the questionnaire [redacted] prior to signing the consent form.

Questionnaires can be completed at school or at home. School counsellors are available at school should anyone feel upset while answering any questions regarding their experiences over the last year. School counsellors can also recommend support services and counselling services for anyone who does not wish to speak with a school counsellor. Completed questionnaires to be returned to the drop box at reception.

If you have any questions regarding this information sheet please contact Maria Connolly by email [redacted]. Questionnaires are due back before end of Term 3.

I have read the above information and give consent for: _____
(student name)

to complete the questionnaire. I understand that participation is voluntary and there is an option to withdraw from the survey at any time and does not need to complete every question.

Parent/Caregiver's name: _____ Signature: _____

Date: _____

I request / I do not request the 'Parent questionnaire', which my child can take home from school and once completed can return to the drop box at the school reception.

Student Questionnaire

How are you coping with the effects of Christchurch earthquakes and aftershocks?



Part 1 (we do not require your name):

Q1: Your year level at [redacted] : Year 9 10 11 12 13 (circle which one)

Q2: Can you remember experiencing an earthquake prior to the big earthquake last year on 4 September 2010? YES / NO

If YES to the above question please explain when and where _____

EARTHQUAKE DATES and TIMES and MAGNITUDE	Where were you when you felt this quake? (e.g. at home, at school, at friends, walking home from school, on bus, at the mall etc.) Street name or location also required as results will be mapped. No house numbers are necessary.
4 September 2010 at 4.35am (Magnitude 7.1) (a year ago)	Place: (e.g. at home, at friends etc.) Street name or location:
22 February 2011 at 12.51pm (Magnitude 6.3) (school closed at lunchtime)	Place: (e.g. on bus, walking, at home etc.) Street name or location:
13 June 2011 at 1pm (Magnitude 5.5)	Place: (e.g. at school, not at school etc.) Street name or location: [redacted]
13 June 2011 at 2.20pm Magnitude 6.3)	Place: (e.g. at school, at home etc.) Street name or location:

Part 2: WHAT CAN YOU REMEMBER SEEING AND EXPERIENCING DURING THE EARTHQUAKE ON 22 FEBRUARY 2011? [REDACTED]

-
-
-
-
-

Part 3: HOME LOCATION (No numbers required just the name of the street/road)

1 Have you moved home since the big earthquake last year on 4 September 2010? YES / NO

2. If you answered NO to the above question please write down your street address (no numbers required)

3. If you answered YES and you have moved home over the last year please write down the street names of where you have lived and reasons for the move:

Months	Location of home – street name only	Reason for move (e.g. house damaged etc)
4 September 2010 to		

Part 4: HOME ENVIRONMENT

1 Has either of your parent/caregivers lost their job due to the earthquakes? YES / NO

2 Are you aware if your parents/caregivers have lost income due to the earthquakes? YES / NO

3 If you have answered YES to Q2 or Q3 above, how has this affected you? _____

4 What jobs do your parents/caregivers work at? _____

5 Has one or both of your parents/caregivers discussed leaving Christchurch? YES / NO

6 Did you move temporarily out of Christchurch after the 22 February 2011 earthquake? YES / NO

7 Have you left Christchurch on a 'quake break' that was organised by a charity? YES / NO

Part 5: SCHOOL ENVIRONMENT

- 1 What was the most common way you travelled to and from school before the 22 February 2011 earthquake?
(circle which applies) Bus / cycle / passenger in car / walk / drove my car
- 2 How do you normally travel to school now? (circle) Bus / cycle / car / passenger in car / walk / drove my car
- 3 How long did it take to travel from home to school before 22 February 2011? _____ hours _____ minutes
- 4 How long did it take to travel from home to school on average since March 2011? _____ hours _____ minutes
- 5 Do you miss your old school? (circle) Not at all / a little / sometimes / often / a lot / all the time
- 6 Do you miss the classrooms of your old school? (circle) Not at all / a little / sometimes / often / a lot / all the time
- 7 What do you miss about [REDACTED] on its original site? _____
- _____
- 8 On Monday 13th June at 1pm we experienced a large earthquake during form time. What can you remember about how you felt and how other students reacted around you
- _____
- _____
- _____

Part 6: EDUCATION PERFORMANCE

	These questions are to find out more about you and your learning over the past year. Read each question and indicate how much by putting an X in the box that best describes you.	Not at all	A little	Sometimes	Often	A lot	All the time
	Example: do you feel the earthquakes have affected you?			X			
1	Do you feel the earthquakes have affected your concentration levels during school time?						
2	Do you feel the earthquakes have affected your concentration levels when completing homework?						
3	With the change of school hours, do you find it difficult to complete your homework?						
4	When you were at school on the original site (normal school hours) did your friends help you with your homework?						
4a	With the shift [REDACTED] (and change in school hours) do your friends still help you with your homework?						
4b	Has the move of school sites made keeping in touch with your friends more difficult?						
5	Do your parents assist you in completing homework or study?						
5a	Has the amount of help you receive from your parents changed during this year?						
6	Do your parents wish you had normal school hours so they could assist you in completing homework or helping you with studying for tests etc.						
7	With the change in school hours, do you miss out on getting help from your parents to complete your homework?						
8	Is your new school site improving your ability to achieve?						
9	Senior students: do you feel you are behind in your school achievement this year?						
10	Senior students: do you feel you are behind in achieving internal credits this year?						
11	Senior students: do you feel at risk of not achieving enough credits this year?						

12. Please write down what you would have liked to do to achieve better if you had the power to do so:

Part 7: HEALTH AND WELLBEING

1. Have you had more than five days off school due to sickness this year? YES / NO

2. Have you had more days off school due to sickness this year than last year? YES / NO

3. This year, do you regularly exercise or play sport? YES / NO

4. Are you exercising or participating in team sports less this year compared with last year? YES / NO

5. If you answered YES to the above question, please describe the reasons why _____

6. As your school hours have changed, are you eating dinner later than you did before the earthquakes? YES / NO

7. Please describe your average school day:

Time you get up: _____ Time you leave home: _____

Time you arrive at school: _____ Time you arrive home from school: _____

Time you eat dinner: _____ Time you go to sleep: _____

These questions are to find out more about your health and wellbeing over the past year. Read each question and indicate how much by putting an X in the box that best describes you.		Not at all	A little	Sometimes	Often	A lot	All the time
8	When you wake during the night because of an aftershock do you feel tired the next day?						
9	Do you feel anxious when you feel a large earthquake or aftershock?						
10	Do you feel you are getting used to feeling earthquakes and aftershocks?						
11	Do you think you are less healthy now than you were before the earthquakes started?						

12. How would you describe your current state of health? (please circle): excellent / very good / good / fair / poor

Thank you for taking part in this research

Please return this questionnaire to your form teacher

Teacher and Staff Questionnaire
How are you coping with the effects of Christchurch earthquakes and aftershocks?



Part 1 (we do not require your name):

Q1: Can you remember experiencing an earthquake prior to the big earthquake last year on 4 September 2010? YES / NO

If YES to the above question please explain when and where _____

EARTHQUAKE DATES and TIMES and MAGNITUDE	Where were you when you felt this quake? (e.g. at home, at school, at friends, walking, on bus, at the Town Hall etc.) Street name or location also required as results will be mapped. No house numbers are necessary.
4 September 2010 at 4.35am (Magnitude 7.1) (a year ago)	Place: _____ (e.g. home, at friends etc.) Street name or location: _____
22 February 2011 at 12.51pm (Magnitude 6.3) [REDACTED]	Place: _____ (e.g. school, the Town Hall etc.) Street name or location: _____
13 June 2011 at 1pm (Magnitude 5.5)	Place: _____ (e.g. at school, not at school etc.) Street name or location: _____ (e.g. [REDACTED])
13 June 2011 at 2.20pm (Magnitude 6.3)	Place: _____ (e.g. at school, at home etc.) Street name or location: _____

Part 2: WHAT CAN YOU REMEMBER SEEING AND EXPERIENCING DURING THE EARTHQUAKE ON 22 FEBRUARY 2011? School closed at lunchtime. You may have been in the Town Hall.

-
-
-

Part 3: HOME LOCATION (No numbers required just the name of the street/road)

1 Have you moved home since the big earthquake last year on 4 September 2010? YES / NO

2. If you answered NO to the above question please write down your street address: _____

3. If you answered YES and you have moved home over the last year please write down the street names of where you have lived and reasons for the move:

Months	Location of home – street name only	Reason for move (e.g. house damaged etc)
4 September 2010 to		

Part 4: SCHOOL ENVIRONMENT

1 What was the most common way you travelled to and from school before the 22 February 2011 earthquake?
(circle which applies) Bus / cycle / passenger in car / walk / drove my car

2 How do you normally travel to school now? (circle) Bus / cycle / passenger in car / walk / drove my car

3 How long did it take to travel from home to school before 22 February 2011? _____ hours _____ minutes

4 How long did it take to travel from home to school on average since March 2011? _____ hours _____ minutes

Part 5: HEALTH AND WELLBEING

1 When you wake during the night because of an aftershock do you feel tired the next day? Not at all / a little / a lot

2 Do you feel anxious when you feel a large earthquake or aftershock? Not at all / a little / a lot

3 Do you feel you are getting used to feeling earthquakes and aftershocks now? Not at all / a little / a lot

4 Do you think you are less healthy now than you were before the earthquakes started? Not at all / a little / a lot

5 Please circle which describes your current state of health: excellent / very good / good / fair / poor

3. Do you have any comments that you would like to make regarding the impacts of the earthquakes on you and your family?

Thank you for taking part in this research

Parent and Caregiver Questionnaire
How are you coping with the effects of Christchurch
earthquakes and aftershocks?



Part 1 (we do not require your name):

Q1: Can you remember experiencing an earthquake prior to the big earthquake last year on 4 September 2010? YES / NO

If YES to the above question please explain when and where _____

EARTHQUAKE DATES and TIMES and MAGNITUDE	Where were you when you felt this quake? (e.g. at home, with friends, at work etc.) Street name or location also required as results will be mapped. No house numbers are necessary.
4 September 2010 at 4.35am (Magnitude 7.1) (a year ago)	Place: _____ (e.g. home, etc.) Street name or location: _____
22 February 2011 at 12.51pm (Magnitude 6.3) (school closed at lunchtime)	Place: _____ (e.g. home, work etc) Street name or location: _____ WAS YOUR [REDACTED] THAT ATTENDS [REDACTED] WITH YOU ON 22 FEBRUARY 2011 AT 12.51PM? YES / NO
13 June 2011 at 1pm (Magnitude 5.5) 13 June 2011 at 2.20pm (Magnitude 6.3)	Place: _____ (e.g. home, work etc) Street name or location: _____ <div style="background-color: black; height: 20px; width: 100%;"></div> Place: _____ (e.g. home, work etc) Street name or location: _____

Part 2: WHAT CAN YOU REMEMBER SEEING AND EXPERIENCING DURING THE EARTHQUAKE ON 22 FEBRUARY 2011?

-
-
-

Part 3: HOME LOCATION (No numbers required just the name of the street/road)

1 Have you moved home since the big earthquake last year on 4 September 2010? YES / NO

2. If you answered NO to the above question please write down your street address (no numbers required)

3. If you answered YES and you have moved home over the last year please write down the street names of where you have lived and reasons for the move:

Months	Location of home – street name only	Reason for move (e.g. house damaged etc)
4 September 2010 to		

Part 4: HOME ENVIRONMENT

1 Have you or any other adult in your family lost their jobs or income due to the earthquakes? YES / NO

2 Do you consider that you are financially disadvantaged since the earthquakes started one year ago? YES / NO

3. Have you considered leaving Christchurch permanently because of the earthquakes? YES / NO

Part 5: EDUCATION PERFORMANCE

1 Before the earthquakes, did you assist your [] with completing [] homework or study? YES / NO

2 With the change in school hours, has this affected your ability to assist your [] homework or study preparation for school assessments? (please circle) Not at all / a little / sometimes / often / a lot / all the time

3 Does your [] feel anxious because [] not achieving to [] ability at school because of the earthquakes and aftershocks? (please circle) Not at all / a little / sometimes / often / a lot / all the time

Part 6: HEALTH AND WELLBEING

1 Do you feel anxious when you feel a large earthquake or aftershock? Not at all / a little / sometimes / often / a lot

2. How would you describe your current state of health? Excellent / very good / good / fair / poor

3. Do you have any comments that you would like to make regarding the impacts of the earthquakes on you and your family?

Thank you for taking part in this research

Appendix 7: Student Assent Form

September/October 2011



Student Assent Form for Participants

I have read the information sheet and one of my parents/caregivers have signed the consent form approving my participation in the research questionnaire.

I am aware I can withdraw from this research at any time and I do not need to complete every question. I can complete the questionnaire at home or at school. My participation is voluntary and the results of this research will provide information into how Christchurch secondary school students are coping with the effects of Christchurch earthquakes and aftershocks.

This questionnaire is due back before the end of Term 3 (October 7, 2011).

Name (please print): _____

Signature: _____ Date: _____

Appendix 8: Teacher and Staff consent form

September/October 2011



Teacher / Staff Consent Form

I have read the information sheet and wish to participate in this research by completing a questionnaire.

I am aware I can withdraw from this research at any time and I do not need to complete every question. I can complete the questionnaire at home or at school. My participation is voluntary and the results of this research will provide information into the educational impacts of Christchurch earthquakes and aftershocks.

This questionnaire is due back before the end of Term 3 (October 7, 2011).

Name (please print): _____

Signature: _____ Date: _____

Appendix 9: Parent and Caregiver consent form

September/October 2011



Parent / Caregiver Consent Form

I have read the information sheet and wish to participate in this research by completing a questionnaire.

I am aware I can withdraw from this research at any time and I do not need to complete every question. I can complete the questionnaire at home or at school. My participation is voluntary and the results of this research will provide information into the educational impacts of Christchurch earthquakes and aftershocks.

This questionnaire is due back before the end of Term 3 (October 7, 2011).

Name (please print): _____

Signature: _____ Date: _____

Appendix 10: University of Canterbury Human Ethics Committee Approval



HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2011/95

28 September 2011

Maria Connolly
Department of Geography
UNIVERSITY OF CANTERBURY

Dear Maria

The Human Ethics Committee advises that your research proposal "The educational impacts of Christchurch earthquakes and aftershocks on secondary school students: a geographical perspective" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 26 and 27 September 2011.

Best wishes for your project.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Michael Grimshaw'.

Michael Grimshaw
Chair
University of Canterbury Human Ethics Committee

NZQA

New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

[Home](#) > [About us](#) > [Publications](#) > [Newsletters and circulars](#) > [SecQual](#) > [Earthquake Impaired Derived Grade Processes](#)

SecQual



Earthquake Impaired Derived Grade Processes

S2011/050 - 25 Oct 2011

TO:

Principal
Principal's Nominee
All teachers

Earthquake Impaired Derived Grade Processes

NZQA has introduced an Earthquake Impaired Derived Grade process for students whose teaching and learning has been affected by the Christchurch earthquakes.

Eligibility

Candidates for external assessment who were enrolled at a school within the Earthquake Affected School zone before the last day of term 3 are eligible to be covered by the provisions of the Earthquake Impaired Derived Grade Process.

Candidates who are now enrolled at a school **outside** the Earthquake Affected School zone may, with their current school's support, also apply. These schools are advised to consider personal hardship indicators published by the Ministry of Education in relation to [Canterbury Earthquake Scholarships](#). These include changes in:

- personal well-being
- family/whanau or care circumstances
- home circumstances
- schooling arrangements.

In addition, to be considered for an Earthquake Impaired Derived Grade for a standard, a student must:

- be present at the examination session, and;
- make an attempt to answer the paper by presenting standard-specific evidence.

Only candidates directly affected by the earthquakes who attend the examinations and attempt all their papers will be considered for a derived grade for those standard(s). For example, if a student leaves the

bulk of a paper unanswered, or writes nonsense or doodles, this would not constitute a genuine attempt. This is an important message for students.

Grades

The school must supply NZQA with grades derived from assessment of a student against the registered criteria of the standard(s).

- Schools **outside of the Earthquake Affected School zone** must make a Derived Grade application online and note that this is an EIDG.
- All schools **within the Earthquake Affected School zone** must send NZQA their completed EIDG spreadsheet prior to 9 November.

Standard-specific, valid and authentic evidence may be sourced from a range of formal and informal assessment types, including evidence from the learning process, prior learning, naturally occurring evidence and teacher professional judgement. These grades may be generated from:

- school practice examinations
- end of topic tests
- classwork.

The school must retain documentation in support of the grades it reports. This could be in the form of results in a course markbook or completed EIDG coversheets, templates of which were supplied to schools in term 1.

- Use of the template is optional.
- The collection and collation of student evidence supporting an EIDG is not required.

This information may need to be collected from the student's previous school.

Derived grade process for Portfolios and Folders (including for students no longer in the Earthquake Affected School zone)

Students who attended schools in Earthquake Affected School Zone may, with their current school's support, apply for a derived grade for

- Technology level 1
- Design and Visual Communication (DVC), level 1
- Education for Sustainability level 3
- Graphics levels 2 and 3
- Technology levels 2 and 3
- Visual Arts level 3

Level 1 Technology

As level 1 Technology is assessed by written reports, the derived grade process for written examination papers applies. However, candidates who are submitting reports for Technology Level 1 Achievement Standards 91048, 91049, 91050, 91053, 91070, 91074 who have been **severely** affected by the earthquake and aftermath may, with teacher assistance, select from their portfolio the material that best represents the standard. This evidence may be placed in the supplied folder without any further processing as the submission for the standard entered.

The application procedure for portfolios and folders is as follows:

- 1 Principal's Nominee enters candidate details into the derived grade facility online or through the EIDG spreadsheet, as applicable (name, NSN, standard, grade provided by teacher).

Appendix 11: NZQA Earthquake Impaired Derived Grade Process (3 pages) p.3 of 3

- 2 Schools attach a pink label to each portfolio or folder where the candidate has made application. Schools within the Earthquake Affected Zone will be sent these directly. Schools outside Christchurch, or those who need to request additional labels should email NZQA at chcheq@nzqa.govt.nz.

- 3 Portfolios and folders are collected by the courier to meet these deadlines:

Note: Examinations commence 10 November

Subject	Existing Deadline <i>(to be met by schools outside the zone with Earthquake affected students)</i>	New Deadline <i>(for schools within the Earthquake affected School zone only)</i>
Education for Sustainability Level 3	Wednesday 2 November	None - Existing deadline applies
Technology (including DVC) Levels 1 - 3 and Scholarship	Wednesday 2 November This is the date for collection by courier	Wednesday 16 November
Graphics Levels 2 & 3 and Scholarship		
Visual Arts Level 3 & Scholarship	Wednesday 9 November All level 3 portfolios must be collected by the the courier by Wednesday 9 November	None - Existing deadline applies
Visual Arts Level 1	Thursday 27 October	Submission optional Existing deadline to be met
Visual Arts Level 2	Wednesday 2 November	Submission optional Existing deadline to be met

- 4 Standard-specific, authentic evidence is required for marking to proceed
 5 Marking panels mark portfolios and folders as normal.
 6 Derived grade portfolios and folders from affected candidates are re-assessed taking into account the body of evidence and the teacher's grade.
 7 A final grade is decided.
 8 Grades are reported as normal.

Enquiries

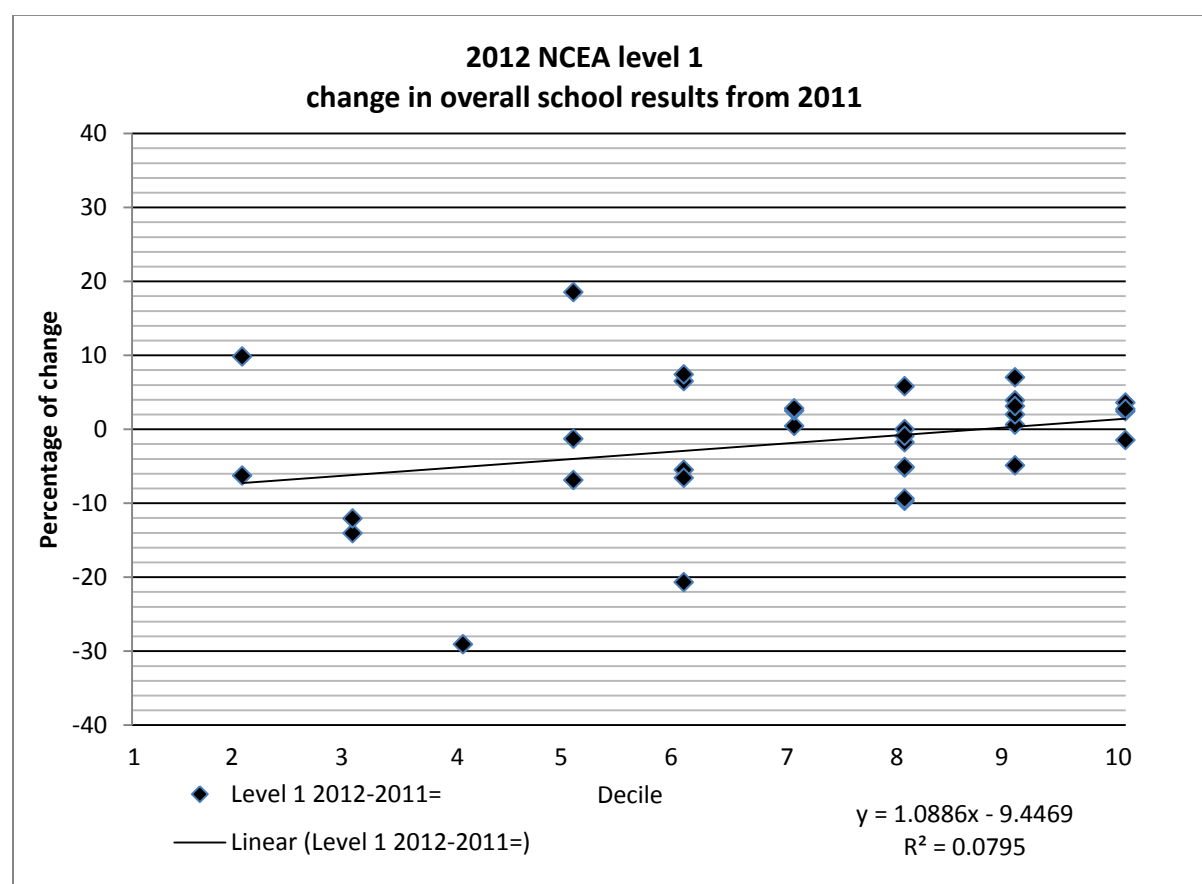
Please refer any enquiries relating to this circular to your School Relationship Manager:

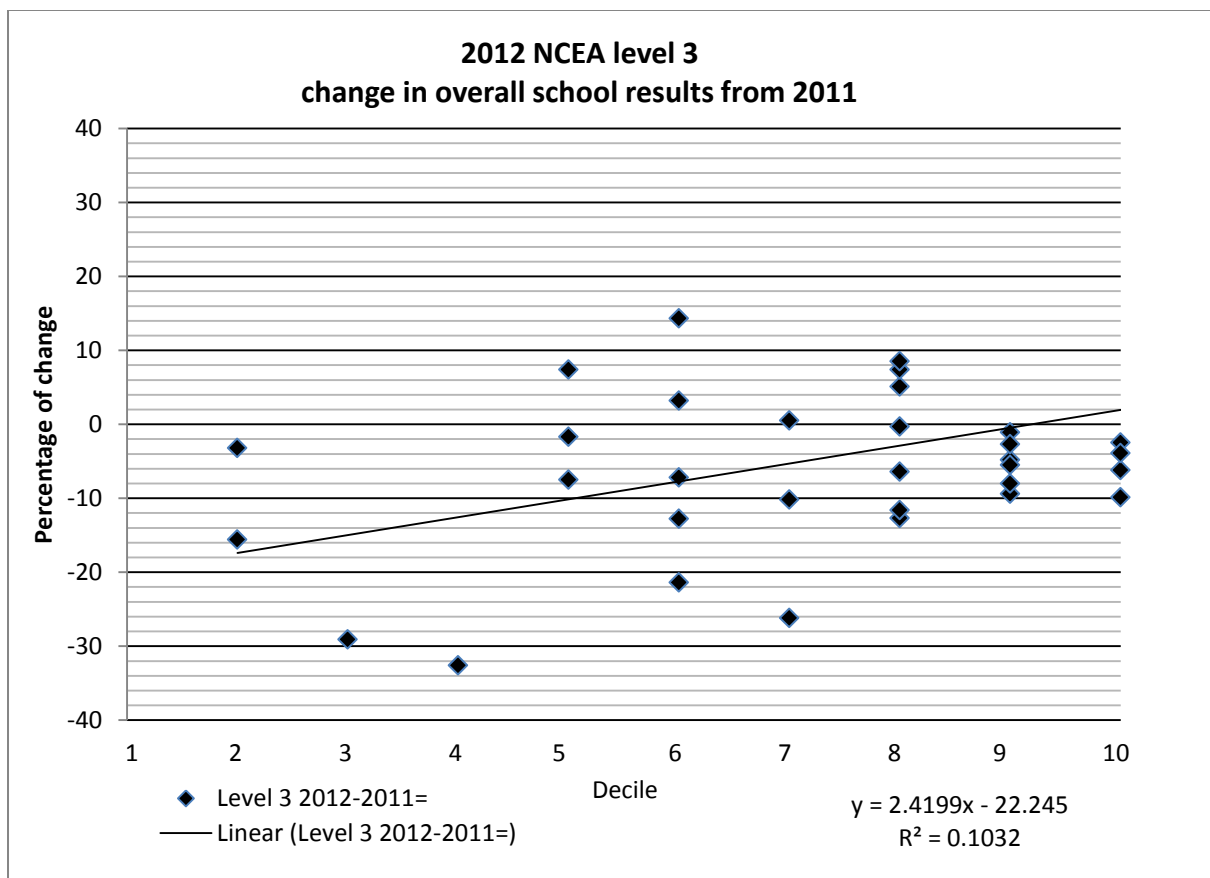
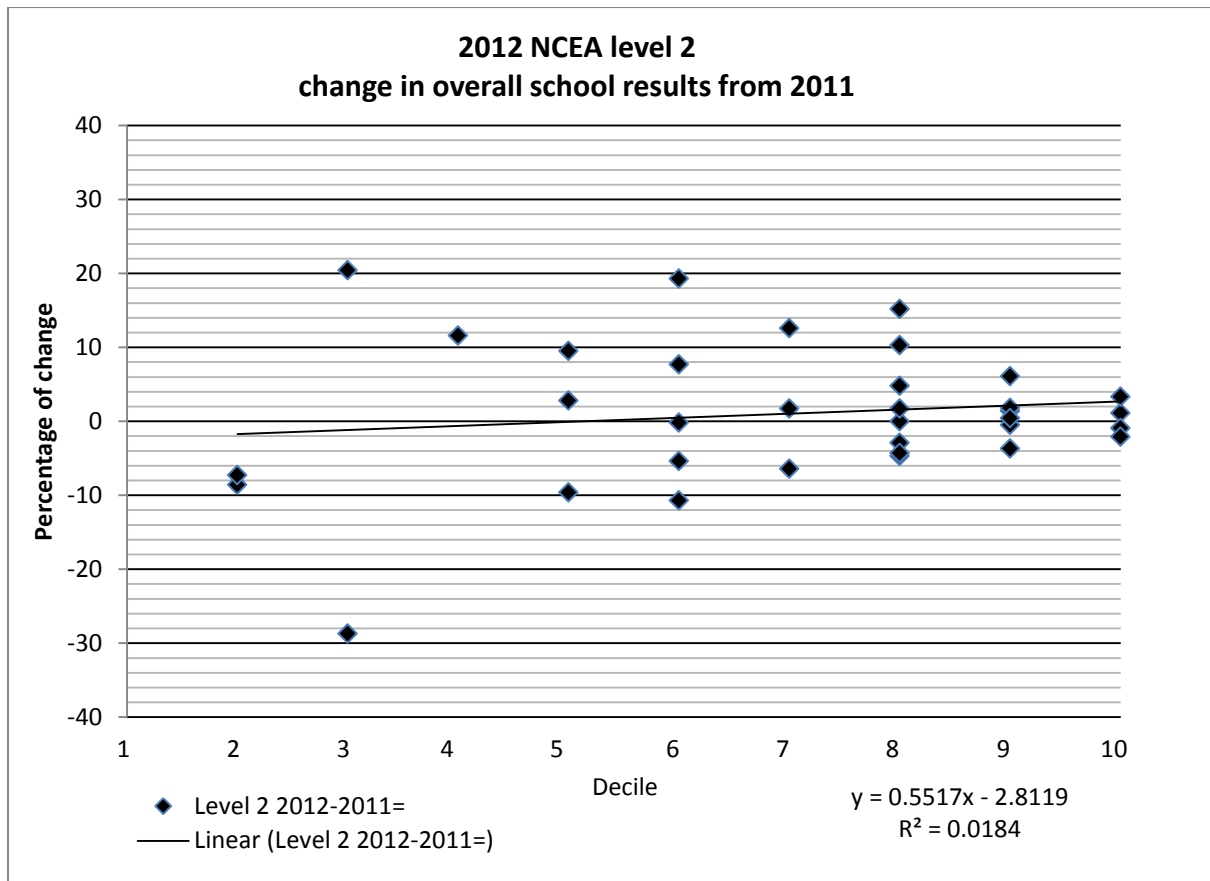
School Relationship Manager
 School Quality Assurance and Liaison
 Telephone: 04 463 3000
 Fax: 04 463 3113
 Email: firstname.lastname@nzqa.govt.nz

Copyright © New Zealand Qualifications Authority

Appendix 12: 2012 NCEA levels 1-3 results as a percentage of change from 2011 NCEA results (2 pages)

	Decile									
	1	2	3	4	5	6	7	8	9	10
Average	0	-5.2	-17.4	-16.7	1.2	-2.1	-2.5	2.1	-0.8	-1.2
Median	0	-6.8	-21.4	-29.1	-1.3	-5.4	0.5	-0.6	-0.1	-1.2
Min	0	-15.6	-41.0	-32.6	-9.6	-21.4	-26.2	-12.7	-9.4	-9.9
Max	0	9.8	20.4	11.6	18.5	19.3	12.6	66.7	7.0	3.6





Appendix 13: 2012 NCEA level 3 results as a percentage of change from 2011 NCEA level 3 results.

	Decile									
	1	2	3	4	5	6	7	8	9	10
Average	0	-9.4	-35.1	-32.6	-0.6	-4.8	-12.0	7.1	-5.3	-5.6
Median	0	-9.4	-35.1	-32.6	-1.7	-7.2	-10.2	2.4	-5.2	-5.1
Min	0	-15.6	-41.0	-32.6	-7.5	-21.4	-26.2	-12.7	-9.4	-9.9
Max	0	-3.2	-29.1	-32.6	7.4	14.3	0.5	66.7	-1.1	-2.5